

MONTHLY WEATHER REVIEW.

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No. 1.

INTRODUCTION.

This REVIEW for January, 1894, is based on reports from 3,071 stations occupied by regular and voluntary observers. These reports are classified as follows: 154 reports from Weather Bureau stations; 41 reports from United States Army post surgeons; 2,162 monthly reports from state weather service and voluntary observers; 29 reports from Canadian stations; 220 reports through the Southern Pacific Railway Company; 429 marine reports through the co-operation of the Hydrographic Office, Navy Department, and "New York Herald Weather Service;" 36 weekly reports from 10 U. S.

Life-Saving stations; no reports from navigators on the Great Lakes; monthly reports from local services established in all states and territories; and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

The WEATHER REVIEW for this month has been prepared under the general editorial supervision of Prof. Cleveland Abbe. The statistical data is furnished by the Records Division, in charge of Mr. A. J. Henry, acting chief of that division.

CHARACTERISTICS OF THE WEATHER FOR JANUARY, 1894.

HIGH AREAS.

The most important area of high pressure was that which attended the cold wave of January 23-26; the highest pressures recorded in this connection were 31.24, at Calgary, Alberta, and 31.08 at Havre, Mont., on the 23d, a. m. The lowest temperatures recorded were -38, at Valentine, Nebr., and St. Vincent, Minn.; -36 at Williston, N. Dak., January 24, a. m., and -44 at White River, Ont., January 25, a. m.

LOW AREAS.

The lowest pressures recorded during the month were 28.48, at Sidney, C. B. I., on the 13th, a. m.; 28.88, at Halifax, N. S., on the 12th, p. m.; 28.78, at Boston, Mass., on the 30th, a. m.;

28.78, at Eastport, Me., on the 30th, p. m.; 28.88, at Sydney, C. B. I., 31st, a. m. The storms attending these lows were the severest of the month.

TEMPERATURE.

Temperatures were generally above the average throughout the United States, the only exceptions being Montana, the Dakotas, California, and Arizona.

PRECIPITATION.

The total quantity of rain or melted snow was slightly below the average in the Gulf and Atlantic States, but above the average in northern California, Washington, Oregon, Idaho, Montana, Manitoba, the upper Lake region, and Ontario.

ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level for January, 1894, as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), is shown by isobars on Chart II, which also gives the so-called resultant wind direction, as explained on pages 365-367 of the REVIEW for December, 1893. The computation of these resultants for January, 1894, is also given in a subsequent part of the present REVIEW. The pressures here charted are those shown by mercurial barometers uncorrected for the effect of the variations of gravity with latitude. This correction is shown by the numbers printed on the border of Chart II; it should be applied and new isobars drawn by those engaged in special researches.

The normal distribution of atmospheric pressure and normal resultant wind direction for the month of January were approximately shown on Chart VIII of the REVIEW for January, 1893, as computed by Prof. H. A. Hazen, and are not now reproduced.

As compared with the normal for January, the mean pressure for the current month was deficient throughout the in-

terior of the country, but in excess over California and on the Atlantic coast. The line of no departure passes through Sault Ste. Marie and Grand Haven, Mich., Cincinnati, Ohio, central Kentucky, western Tennessee, Montgomery and Mobile, Ala., central Louisiana, and southward into the Gulf; it reappears in central Texas, passes northward along the one hundred and ninth meridian, westward on the forty-second parallel, southwest to central Nevada, northwest to Eureka, Cal., and the Pacific coast. The greatest excess of pressure was 0.09 in central New England, Maine, and the Maritime Provinces; 0.05 at San Francisco and Los Angeles, Cal. The greatest deficiencies were 0.18 at Calgary, Alberta, 0.13 at Medicine Hat, Assiniboia, and 0.11 at Tatoosh Island, Wash.

As compared with the preceding month of December, 1893, the mean pressure for January, 1894, has fallen decidedly in Washington and Oregon, but risen in Nova Scotia, New England, and the St. Lawrence Valley. The line of no change enters California at San Francisco, and passes out between Yuma and San Diego; it also passes from central Alberta southeast to central Nebraska and thence to the center of

Lake Michigan, the southern edge of Lake Erie, through central West Virginia and Virginia, eastward to the Atlantic. The larger falls in pressure were 0.14 or 0.15 on the coast of Oregon and Washington; 0.08 or 0.09 in Texas, Louisiana, and Arkansas; a decided fall also occurred in Manitoba. The larger increases of pressure have been 0.06 at Edmonton, Alberta, and Swift Current, Assiniboia; also at Northfield, Vt., Montreal and Quebec, Quebec, Halifax, N. S., and Portland, Me., and 0.07 at Eastport, Me., and Chatham, N. B.

The periodic diurnal variations of local pressure are shown by the hourly means given in Table VI, of meteorological data, on a subsequent page.

PATHS OF HIGH AND LOW AREAS.

The paths pursued by centers of high and low pressure during January, 1894, are shown on Charts Nos. IV and I, respectively, and the duration and velocity are given in the table at the end of this chapter. The charts show by small circles the positions of the centers. Within the circles are given the pressures reported nearest the centers and the corresponding dates. If a decided trough of low pressure or ridge of high pressure exists at that time its location is shown by a short wavy line through the center. Sometimes distant centers are connected by such ridges or troughs, but in such the middle portion of the wavy line is omitted in order to avoid confusing the map.

HIGH AREAS.

I.—On the 1st, a. m., pressure was highest in West Virginia and western Tennessee; this area moved slowly eastward as a ridge extending northeast and southwest, while areas of low pressure developed on its northwest and southeast sides.

II.—On the 1st, p. m., pressure was rising in Alberta, and a small area of high pressure moved southeastward, disappearing on the 4th in the Missouri Valley as the southeastern end of a ridge in connection with high area No. V.

III.—On the 2d, p. m., pressure had risen west of Oregon and British Columbia; this rise extended southward, and on the 3d, p. m., was west of northern California, while low area No. IV was central in Alberta and Saskatchewan.

IV.—On the 4th, a. m., pressure was apparently rising north of Lake Superior, with cold, northerly winds in the rear of low area No. II; the exact location of the center can not be given, but its general path was southeast until it disappeared on the 6th, p. m., over New Brunswick.

V.—On the 4th, p. m., an area of high pressure was advancing southeastward as a ridge, whose center was over Alberta; this extended by the 6th, a. m. into a large area of high pressure, whose center was then in northern Utah and Nevada. On the 5th, p. m., two centers had been located in Oregon and Wyoming, respectively, forming a ridge extending east and west, but these had again combined on the morning of the 6th in northern Utah and Nevada, and very low temperatures prevailed in California. This ridge slowly extended southward and again subdivided into areas Va and Vb, which were central on the morning of the 7th in California and New Mexico, respectively; they had disappeared on the morning of the 8th, although pressure remained generally high throughout the Pacific coast and Rocky Mountain regions, and the high pressure attending area No. V became the southern part of the still higher pressure, No. VI, since no trough of low pressure developed between them.

VI.—On the 6th, a. m., pressure was rising in Saskatchewan and Assiniboia and by the 7th, a. m., was highest in North Dakota; here the ridge divided into two parts, VIa and VIb. A slight trough developed on the southwest side from Washington to Wyoming, but had filled up by the morning of the 8th, when the highest pressure was in Alberta, and a ridge extended thence southeast to West Virginia, where high pressure area No. VIb was then central. The principal high

area, No. VIa, moved southeastward on the 8th to the northern border of Montana, after which it divided into two portions, the main branch, VIa, moved southwest into Utah, where it was central on the 9th, a. m., and a minor center, VIc, moved southeast into Nebraska, whence it moved northeast and joined high area No. VIII. The Utah area moved slowly southward, maintaining a high pressure over the central and southern Rocky Mountain plateau; on the 11th, p. m., it was still central in Utah, while another branch, No. VI d, had moved off to the east and was then central in Indian Territory. The high area, No. VIa, continued to prevail over the central and southern Rocky Mountain plateau until the 13th, and disappeared on the 15th, a. m., in Arizona, but reappeared in California on the 16th, p. m., after which it moved steadily east-northeast to Lake Superior, where it joined high area No. VIII. The branch, No. VI d, moved eastward through Arkansas and Tennessee and disappeared on the 14th, a. m., off the coast of Georgia. It thus happened that from the 6th to the 14th high pressure and clear weather prevailed over the Rocky Mountain region and the Southwest.

VII.—On the 15th, a. m., an area of high pressure was apparently advancing southeastward over Manitoba. The center of this area moved eastward beyond the northern limit of our stations, where cold, northerly winds and high pressure prevailed. It passed over the mouth of the St. Lawrence on the 17th, and descending southward disappeared on the 18th on the coast of Nova Scotia as a long ridge extending southwest to Georgia, where pressure was highest on the 18th, p. m. This latter center is numbered VIIa, since it owed its existence more to the outflow from high area No. VII than to the flow of air from other regions into the trough containing low area No. XIII.

VIII.—On the 17th, p. m., pressure was rising in Saskatchewan, with low temperatures, while high area No. VIa was central in Utah, and low areas prevailed on the west in British Columbia and on the east over Lake Superior. High area No. VIII moved southeast to Lake Superior, where it was central on the 19th, a. m., and high area No. VIa moved northeast to Lake Superior, where the two joined on that date, they having in the meantime contributed largely to the development of low area No. XIII which adjoined them on the east.

IX.—On the 18th, a. m., pressure began rising in northern Alberta, while low pressure prevailed in British Columbia. The highest pressure, at Edmonton, Alberta, occurred on the 19th, a. m., after which it fell and again rose on the 20th, with very low temperatures.

X.—Pressure rose on the 18th west of California and on the morning of the 19th was highest at San Francisco. On the 19th, p. m., high pressure prevailed over the central and southern plateaus and California, while low area No. XVI was central on the coast of British Columbia. Pressure again fell on the 20th as the high center moved south and east into Arizona, where it disappeared.

XI.—On the 20th, p. m., pressure had risen decidedly, with low temperatures, in northern Alberta. Pressure steadily increased during the 21st and 22d, the maximum reported being 31.24, with temperature of -30 at Calgary on the 23d, a. m., (a still higher report on the 23d, p. m., is supposed to be a telegraphic error). This remarkable high central pressure was not preceded by any notable fall of pressure in any portion of our Daily Weather Map, but low pressure prevailed on the 19th, p. m., from Washington northward and westward, and an extensive storm may have existed on the Pacific coast of southern Alaska; at this same time low area No. XVI was passing northeastward over the upper Lake region. The area of high pressure evidently represented the banking up of cold descending air which reached the earth's surface on the northeast slope of the Rocky Mountains in Athabasca, Alberta, and Saskatchewan, and thence spread in all directions, principally

southeastward. The steep barometric and thermal gradients toward the southwest on the 20th, 21st, and 22d represent the effort to push over the Rocky Mountains, while the northwest winds of Assiniboia, Montana, and the Dakotas represent the resulting flow of the air toward the southeast. The extensive cold wave that attended this flow of air was modified by the fact that moderately high pressures were already prevailing over the greater portion of the United States.

The line of freezing temperatures on the morning map of the 21st extended from northern Oklahoma northeast to Sault Ste. Marie, Mich.; on the 22d from southern Oklahoma to Lake Ontario; and on the 23d from southern Oklahoma to Massachusetts; therefore, its southeastward movement had been very slow up to that time, but during the 23d the cold wave swept rapidly southward, and on the morning of the 24th freezing temperatures prevailed over the whole of Texas, and the isotherm of 32° passed from Galveston to central Tennessee, Detroit, Mich., and just north of lakes Erie and Ontario, so that the area above freezing was pushed northward over New York while it was pushed southward beyond Texas. By the morning of the 25th the area of temperatures below 32° had pushed eastward over the greater part of the Atlantic and Gulf States and southward into the western portion of the Gulf of Mexico, where a severe norther prevailed. Cold northerly gales began at Corpus Christi and Galveston, Tex., and New Orleans and Port Eads, La. The norther must have reached Vera Cruz by the morning of the 25th, but no reports have yet been received from that region. The technical cold wave, viz., a fall of 20° within 24 hours and to temperatures of 40° and below, will be found described under "Cold Waves." The center of high area No. XI passed from Alberta on the 23d, a. m., southeast to Nebraska on the 23d, p. m., thence south into Kansas on the 24th, a. m., after which it turned northeast as usual and disappeared on the 27th, a. m., in Newfoundland, where the pressure at that time was 30.64 at St. Johns.

XII.—On the 24th, a. m., pressure again began rising in Alberta and Saskatchewan, while it was falling on the western slope of the Rocky Mountains, and an area of high pressure passed eastward over Manitoba on the 25th and 26th, after which it stretched southward and disappeared on the 28th as a small area on the middle Atlantic coast.

XIII.—On the 27th, a. m., pressure had risen over the middle Rocky Mountain plateau region, while slight depressions prevailed to the north and south; this area maintained that position during the 28th, but on the morning of the 29th the highest pressure had moved southeastward into Texas, after which it moved eastward over the Gulf and disappeared on the 31st east of Florida.

LOW AREAS.

I.—This appeared off the coast of British Columbia on the 1st, a. m., and by 1st, p. m., a trough had developed, covering Washington, Wyoming, and Minnesota; low areas Nos. I, II, and III were central in those States, while high pressure prevailed north and south of this trough. Low area No. I then filled up and disappeared.

II.—This was central in Montana on the 1st, a. m., moved southeast into Iowa, thence northeast over the Lake region, expanding, on the 3d, into a trough stretching northeast and southwest; on the 4th it moved rapidly and disappeared over the Gulf of St. Lawrence.

III.—This depression constituted the eastern end of a trough of low pressure on the 1st, p. m., but rapidly disappeared by merging into low area No. II.

IV.—A decided low area appeared on the 3d, a. m., in Alberta; it disappeared probably by moving northeast beyond our stations by the 4th, a. m. At this time an independent centre, No. IVa, was developing in Indian Territory,

which passed northeastward and disappeared on the 5th, p. m., off the coast of New England.

V.—A slight depression moved over the southern plateau region between the 4th, p. m., and the 5th, a. m.; by the 6th, a. m., it had moved from Texas to Indiana, and a slight depression prevailed over a large region. By the 7th, a. m., a new center, No. VII, had developed in Virginia and North Carolina, while the original had disappeared in Canada.

VI.—A slight depression existed in the west Gulf States on the 5th, a. m., and by 8 p. m. of that date had merged with low area No. V.

VII.—This area developed on the 6th and 7th off the middle Atlantic coast; it was of a very indefinite nature at that time, but by the morning of the 8th had developed into a well-marked storm center south of Newfoundland.

VIII.—This area appeared as a slight depression between opposing winds in southern Texas on the 6th, a. m.; it retained the characteristics of a long trough until the 7th, a. m., when it was central in North Carolina. The southern end of this trough filled up and the northern end developed into low area No. VII.

IX.—A low area appeared off the coast of Washington on the 6th, a. m., and continued, until the 7th, a. m., to expand southeastward as a trough into Idaho, after which it filled up in the presence of high areas on its northeast and southwest sides.

X.—A slight depression appeared on the 8th, p. m., in western Kansas. By the 9th, a. m., this had moved into northeastern Texas, and by the 9th, p. m., a large area of relatively low pressure prevailed from the Lake region southward to the Gulf. This expanded into an indefinite depression whose center remained in the Gulf States during the 10th, and was in North Carolina on the 11th, a. m., after which it disappeared.

XI.—During the 8th a low area moved southeastward over Alberta, and on the 9th, a. m., the center was in that province; it moved southeast and on the 11th, a. m., was central north of Lake Huron, with westerly gales over the Lake region. On the 11th, p. m., it crossed the St. Lawrence between Montreal and Quebec, and on the 12th, a. m., was central in southwest Nova Scotia, with northwest gales throughout New England, the Middle States, and the lower Lake region; an hour before the 8 a. m. report the barometer at Bermuda read 29.69, with westerly winds of force 6 and clear weather. On the 12th, p. m., the center was near and a little east of Halifax, where the barometer at that moment read 28.88. On the 13th, a. m., the center was a little east of Sidney, Cape Breton, where the pressure at that moment was 28.48, and northwest gales still continued on the coast of New England, with temperatures varying from zero at Eastport, Me., to 22° at New York, N. Y. On account of the low temperatures and high winds this storm was very severe; many vessels encased in ice became helpless. The schooner *Minnie C. Taylor* was wrecked near the Weather Bureau station at Nantucket, Mass. "The service rendered by our telephone wire to Great Point was invaluable on this occasion, as it enabled the life-saving crew to keep posted as to the movements of the schooner before she struck and to have a wrecking crew promptly at the spot and thus save a great part of the cargo."

XII.—On the 11th, a. m., a low area was moving southeastward into Alberta while low area No. XI was central between Huron and James Bay; pressure was at that time high over the Rocky Mountain plateau region and the boundary between the high and low pressure may be described as passing from Florida northwest to Manitoba and thence southwest to Oregon, consequently low areas Nos. XI and XII represent whirls on the northeast side of this large region of high pressure. By the 13th, a. m., low area No. XII had moved south-

east to Calgary, where pressure was then 28.94, while low area No. XI was central near Cape Breton, and a high area covered the southern half of the United States. As low area No. XII moved eastward, or possibly northeastward, its deep depression filled up and disappeared on the 15th, leaving a moderate and extensive area of depression extending from the lower Missouri Valley to James Bay, while a more decided depression extended from the same region northwest to Washington.

XIII.—Between the 13th, a. m., and 14th, a. m., pressure rose decidedly in Alberta, but fell on the Pacific coast, and a depression began to extend eastward into Montana; this was central on the 14th, a. m., some distance to the west of the coast; on the 14th, p. m., near Tatoosh Island, Wash.; and on the 15th, a. m., in Montana. This trough moved northward, and on the 15th, p. m., extended from Vancouver Island eastward to Assiniboia. On the 16th, a. m., the principal center was in southern Montana, and p. m., in southern Dakota; 17th, a. m., in Iowa, and p. m., over Lake Superior; 18th, a. m., over Lake Huron, with warm southerly gales over the lower lakes. The center then moved rapidly northeast and disappeared over Labrador on the 19th.

XIV.—An indefinite depression, with rain, prevailed over the lower lake region on the 15th, a. m., and by the 16th, a. m., the center was southeast of the New England coast, after which it disappeared.

XV.—By the 19th, a. m., the barometer had fallen in Colorado, New Mexico, western Nebraska, Kansas, and Texas, while it had risen in California. From this condition a low area resulted whose center was near the boundary of Colorado and Texas on the 19th, a. m. This depression rapidly developed in that region, and on the 28th, a. m., was central in northern Iowa as a general storm; high southerly winds, with rain, prevailed from Texas to the Lake region and northerly winds, with snow, from Lake Superior and Manitoba to southern Minnesota. On the 20th, p. m., the center was near Lake Superior, with a general increase in the winds and the extent of rain and snow area; after this it moved northeastward and disappeared over Labrador on the 22d, a. m.

XVI.—On the 19th, a. m., pressure began to fall on the coast of Oregon and British Columbia, and by the 19th, p. m., the low center was probably inside of Vancouver Island. Like its predecessors this depression soon became a long trough which, on the 20th, a. m., extended southeast over Montana and made connection with low area No. XV that was at that time central in Iowa, so that the morning map showed the highest pressures in New England, Arizona, and Alberta or Saskatchewan, while the low pressure area extended from Texas northward to Lake Superior, and from Iowa northwest to Vancouver Island.

XVII.—From the 21st, a. m., to the 22d, a. m., pressure generally fell somewhat over the southern Rocky Mountain plateau and adjacent regions; the appearance of the remarkable high area, No. XI, extending from Alberta southeastward along the northeast slope of the Rocky Mountains argues the contemporaneous existence of the extensive low area to the southward. No center can be assigned to this area of low pressure, as it was undoubtedly an extension northward of the equatorial depression on the Pacific Ocean and the west coast of Mexico. On the 22d, p. m., the northwest end of this trough had reached Yuma, Ariz., where the pressure was then 29.88, and the trough of 29.90, or less, undoubtedly extended southeastward over the Gulf of California; at the same time cold northerly winds, with high pressure, were advancing rapidly southward over Nebraska and Kansas into Texas, and a rather high pressure, with northwest winds, also prevailed in northern California. These conditions were not favorable to the formation of a whirl north of the Mexican border or west of the Mexican plateau, and in the absence of reports from Mexico we can not state from observation what occurred in

that region, but on the 23d, a. m., there was evidently a small whirl and barometric depression on the southern border of Texas in a location where topographic conditions were favorable to its further development.

This was followed by an immediate increase of cold northerly winds over Texas and a heavy norther on the coast, which was followed, as usual, by the breaking up of whirls to the westward of the norther and the formation of new and more important whirls, or storm centers, to the south and east. High area No. XVII, therefore, disappeared after the 23d, p. m., and in its place a trough developed reaching from Louisiana to Lake Huron, and over the latter region low area No. XVIII was located on the 24th, a. m. This center was between Montreal and Quebec on the 24th, p. m., and westerly gales prevailed over the lower lake region. On the 25th, a. m., the center was apparently in Labrador, where it disappeared.

XIX.—The eastward movement on the 25th of the high area just alluded to may have been accelerated by the presence of a general depression in the West Indian region; its northerly winds reached Cape Hatteras, N. C., by the 25th, a. m., and Florida and Key West on the 25th, p. m.; this was of course followed by rain at all south Atlantic stations, and a special area of low pressure appeared east of Florida on the 26th, a. m. The center was east of North Carolina on the 26th, p. m.; south of Cape Cod, Mass., on the 27th, a. m.; and east of Halifax, N. S., on the 27th, p. m., after which it disappeared from our map.

XX.—On the 26th, a. m., the pressure was falling in northern Alberta, and by the 27th, a. m., a trough of low pressure was central in that region, while at the same time the pressure was higher on the southwest than on the northeast side of the trough. This trough extended southeastward over the Dakotas; its northwestern extremity filled up, and on the 28th, a. m., a depression was central near Yankton, S. Dak. The depression moved eastward over Iowa and Lake Michigan, where it was central on the 29th, a. m. Meanwhile another low area, No. XXI, had moved southeastward along the south Atlantic coast, and during the 29th the latter developed into an important storm then central near Baltimore, Md., while low area No. XIX as rapidly diminished in importance and on the 29th, p. m., appeared only as a relatively small depression in Michigan on the northwestern boundary of the whirl attending low area No. XXI. It disappeared on that date.

XXI.—The maps of the 27th, a. m. and p. m., showed a high pressure central on the Rocky Mountain plateau region, with northerly winds flowing to Mexico; the barometer had fallen in southern Texas, with northeast winds and rain; evidently a whirl, with low pressure, was developing on the Mexican border. This center probably moved slightly southeastward and then turned northeastward over the central portion of the Gulf of Mexico; it passed over northern Florida after the 28th, p. m., at which time a high barometer was central in southern New England, and northeast winds and rain were prevailing on the south Atlantic coast. Having reached this coast the depression was now in condition favorable for rapid growth, and its development was antagonistic to the development of low area No. XX, which was then in Iowa. A southern area of low pressure and cyclonic whirl generally absorbs its northern neighbor. On the 29th, p. m., it was central at the head of Chesapeake Bay, while northeast gales, with rain or snow, prevailed on the New England coast and temperatures of from 30° to 40°. On the 30th, a. m., the low pressure was central a little to the east of Boston, Mass., where the barometer read 28.78; westerly gales were then prevailing over New York, Connecticut, Cape Cod, Mass., and southward to Cape Hatteras, N. C.; easterly gales prevailed over Maine, the St. Lawrence Valley, the Canadian

Maritime Provinces, the Gulf of St. Lawrence, and Newfoundland. On the 30th, p. m., the storm center was in the Bay of Fundy, and pressure at Eastport, Me., was 28.78. On the 31st, a. m., the storm center was between Cape Breton and Newfoundland, and the pressure at Sidney was 28.88.

XXII.—On the 29th, a. m., low pressure was central near Vancouver Island; this extended rapidly inward as a slight and widely-diffused depression, and on the 30th, a. m., the lowest pressure was in Kansas and Colorado, and by the 30th, p. m., it had moved southward, stretching from New Mexico to Missouri, and by the 31st, a. m., still farther southward, extending from northern Texas to the lower Ohio Valley. By the 31st, p. m., this had become a trough reaching from southern Texas to West Virginia, dividing the regions of cold northerly and warm southerly winds; the steepest thermal gradients were a little to the north and parallel to the trough of lowest pressure.

XXIII.—This depression appeared in Alberta on the 31st, p. m.; its further history belongs to the REVIEW for February.

MOVEMENTS OF CENTERS OF AREAS OF HIGH AND LOW PRESSURE.

The following table shows the date and location of the beginning and ending of each center of high or low pressure that has appeared on the U. S. Weather Maps during the month, together with the average daily and hourly velocities for the month. These averages will differ accordingly as we consider each path as a distinct unit, or give equal weight to each hour of observation. The great variability in the rate of motion of these centers in different parts of the same path, or in different portions of the month, or over different portions of the regions covered by the Weather Map, points to the conclusion that the movement is largely influenced by general combinations of motions in the upper portion of the atmosphere, viz., above 5,000 or 10,000, but probably below 20,000 or 30,000 feet. The convection due to the heating and evaporation at the earth's surface does not easily permeate a still atmosphere to any great height, and we can not look to this convection in and of itself, as the exclusive cause or maintainer of extensive storms; on the other hand when the air is once in motion and by pushing over hills and mountains is forced up to considerable heights then the convection thus brought about will, if it intensifies the convection due to heat and moisture, produce conditions favorable to the formation of clouds and rain and the growth of any whirlwind, provided the whirling motion be, in the Northern Hemisphere, cyclonic, so as to be further favored by the action of the centrifugal forces on the revolving globe. If, however, the whirl be in the opposite direction, or if the conformation of the earth's surface be such as to oppose the convection due to heat (as, for instance, when the winds are descending a long slope instead of ascending) then the initial whirlwind is more likely to be annulled, or dissipated by the opposing forces.

During the month of January quite a number of areas of high pressure and low pressure have alike been apparently annulled in this manner while comparatively few have been started under such favorable conditions as to allow of their growth and continued existence for several days. The apparent division of some of these high areas into several portions and the apparent perpetuity of high area No. VIa for ten days in the neighborhood of Utah are all undoubtedly due, in part, to the crudeness of the assumptions that underlie all methods of reducing plateau and mountain stations to sea level.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.										
I.	1, a. m.	29	99	3, p. m.	33	79	1,950	2.5	780	32
II.	1, p. m.	54	112	4, a. m.	46	100	800	2.5	320	13
III.	2, p. m.	51	124	3, p. m.	41	125	800	1.0	800	33
IV.	4, a. m.	53	87	6, p. m.	48	66	1,150	2.5	460	19
Va.	4, p. m.	52	115	8, a. m.	45	126	2,400	3.5	686	29
Vb.	4, p. m.	52	115	8, a. m.	32	105	2,100	3.5	600	25
VI.	6, a. m.	59	104	7, a. m.	47	104	450	1.0	450	19
VIa.	7, a. m.	47	104	21, a. m.	48	50	7,200	14.0	514	21
VIb.	7, p. m.	47	104	11, a. m.	46	64	2,700	3.5	771	32
VIc.	8, p. m.	49	104	9, a. m.	42	101	450	0.5	.....	.....
VId.	11, a. m.	39	111	14, a. m.	30	77	2,100	3.0	700	29
VII.	15, a. m.	52	98	18, a. m.	44	63	1,950	3.0	650	27
VIIa.	18, p. m.	36	81	19, a. m.	33	83	200	0.5	.....	.....
VIII.	17, p. m.	54	106	21, a. m.	47	59	2,250	3.5	643	27
IX.	18, a. m.	54	117	19, p. m.	53	106	450	1.5	300	13
X.	18, p. m.	39	125	20, p. m.	34	110	1,000	2.0	500	21
XI.	20, p. m.	54	120	26, p. m.	46	58	4,000	6.0	667	28
XII.	24, p. m.	55	107	28, p. m.	40	73	2,100	4.0	525	22
XIII.	27, a. m.	42	109	31, p. m.	28	80	2,400	3.5	686	29
Sums.....							36,450	61.5	10,052	.....
Mean of 17 paths.....									591	24.6
Mean of 61.5 days.....									594	25.7
Low areas.										
I.	1, a. m.	49	129	1, p. m.	47	120	400	0.5	.....	.....
II.	1, a. m.	48	108	4, p. m.	48	64	2,750	3.5	786	33
III.	1, p. m.	47	92	2, a. m.	47	86	250	0.5	.....	.....
IV.	3, a. m.	54	114	3, p. m.	55	109	100	0.5	.....	.....
V.	4, p. m.	36	115	6, p. m.	46	84	2,100	2.0	1,050	44
VI.	5, a. m.	31	94	5, p. m.	34	95	250	0.5	.....	.....
VII.	6, p. m.	38	75	8, a. m.	46	57	1,100	1.5	733	31
VIII.	6, a. m.	28	98	7, a. m.	37	81	1,150	1.0	1,150	46
IX.	6, a. m.	48	126	7, p. m.	45	118	450	1.5	300	12
X.	8, p. m.	48	102	11, a. m.	35	78	1,550	2.5	620	26
XI.	9, a. m.	52	113	13, a. m.	47	59	2,700	4.0	675	28
XII.	11, a. m.	55	118	14, p. m.	55	91	1,600	3.5	457	19
XIII.	14, a. m.	48	128	18, p. m.	51	66	3,700	4.5	822	34
XIV.	15, p. m.	43	80	16, a. m.	41	69	600	0.5	.....	.....
XV.	19, a. m.	37	103	22, a. m.	53	64	2,200	3.0	733	30
XVI.	19, p. m.	55	125	20, a. m.	48	113	500	0.5	.....	.....
XVII.	22, p. m.	32	114	23, p. m.	26	99	1,000	1.0	1,000	42
XVIII.	24, a. m.	44	81	25, a. m.	51	60	1,050	1.0	1,050	42
XIX.	26, a. m.	31	77	27, p. m.	45	60	1,400	1.5	933	39
XX.	27, a. m.	53	118	29, p. m.	46	84	1,750	2.5	700	29
XXI.	27, p. m.	26	97	31, a. m.	47	60	2,700	3.5	771	32
XXII.	29, a. m.	49	126	31, p. m.	30	97	2,200	2.5	880	37
Sums.....							31,500	4.20	12,660	.....
Mean of 16 paths.....									791	33.0
Mean of 42.0 days.....									750	31.2

NORTH ATLANTIC METEOROLOGY.

[Pressure in inches and millimeters; wind-force by Beaufort scale.]

The normal pressure for January over the North Atlantic Ocean, as deduced from the international simultaneous observations, is highest, 30.20 (767), in a small area between the Azores and the Windward Islands; it is lowest, 29.50 (749), in a region between southern Greenland, Iceland, and Spitzbergen. As compared with December the normal pressure for January rises about 0.05 in the region southwest of the Azores, but falls in the extreme north Atlantic.

The average velocity of movement of storm centers during January is about 22 statute miles per hour, and at least two or three such storm centers can usually be traced across the

ocean from Labrador and Nova Scotia to Norway and France. During January about an equal number of storm centers seem to reach the Atlantic near Newfoundland from British Columbia, the Gulf States, and the south Atlantic coast, respectively, but in general all of these are whirls developed within long troughs of low pressure whenever such troughs come into locations favorable for such development. All these troughs in January appear as the eastern ends of branches from either the north Pacific depression or the equatorial Pacific depression; the former stretches southeastward into Washington whenever a storm center moves northeastward toward southern

Alaska; the latter or Pacific equatorial stretches northward toward Mexico and the Caribbean Sea under circumstances not yet clearly understood, but when it does so the northerly winds over the United States descend to N. 20° and sometimes N. 15°, and give rise to the storms that pass from Florida northeastward toward Europe. Similarly, in July to September the Atlantic equatorial low stretches northwestward in connection with the development of West Indian hurricanes. An average of five storm paths per month passes eastward over the region between the Great Lakes and Newfoundland. After reaching W. 40° half of these pass northeast to Iceland, while the remainder go east or northeast toward central or southern Europe. Areas of high pressure follow in nearly the same paths; some of them pass from Athabasca southeast to N. 40°, thence east, and are lost in the Atlantic; others pass from the Pacific high area, at N. 35° or N. 30°, northeast to Utah, thence southeast over the south Atlantic States, and are lost in the Atlantic; still others pass from the central and western Atlantic northeastward into Europe, and are lost in the great area of high pressure that extends from southern Russia eastward over China.

In connection with the formation of cyclonic storms in northern and southern latitudes, attention must be called to the fact that frequently, and especially when it invades a continent, the circular cyclone degenerates into a long trough of low pressure, with cold northerly winds on one side and warm southerly winds on the other; in such cases the motions of the clouds show that above these two systems of winds there are corresponding outflowing or returning currents. Such troughs are stable when they extend east and west, as does the equatorial trough of low pressure, but unstable when they extend north and south. From such a trough trending north and south, or northeast and southwest, the circular cyclonic system may again develop, and the alteration from trough to cyclone, or *vice versa*, may in rare cases take place several times before the surplus energy of the storm is dissipated; the whole process is mechanically analogous to the alternate rectilinear and sinuous motions of water through tubes, as investigated by Osborne Reynolds, or to the various forms of wave motion, vortex motion, and steady motion of liquids. The difference between the cyclones of the tropics and the temperate latitudes is well stated in the following extract from "Elementary Meteorology," page 209, just published, by Prof. William M. Davis, of Harvard College:

As with tropical cyclones, the cyclones of our latitudes vary in intensity with the depression of the barometer at the center; and here as there the greater part of the depression is to be regarded as the effect of the centrifugal forces of the revolving winds; but the greater part of these forces in a tropical cyclone arises from the true centrifugal force of the wind's rotation around the storm center, and is only in a lesser proportion due to the deflecting force of the earth's rotation, while this relation is reversed in extra-tropical cyclones, where the deflecting force is greater than the true centrifugal force of the whirl, because of the higher latitude in which these storms occur. The central region of exceptionally low pressure and very steep gradients in tropical cyclones is relatively small, because a strong centrifugal force is produced only when the winds are whirling on a short radius; the low pressure area of our cyclones is much larger and the gradients have a tolerably strong value for some distance around the center, because the depression of the isobars depends rather on the latitude of occurrence than on the distance of the wind from the storm center; for this reason there is less concentration of violence close to the center, and the calm and clear central space or eye is seldom sharply developed, although it is not uncommon to discover a gradual weakening or failing of the winds, and sometimes even an imperfect breaking away of the clouds, as the central area passes over the observer. The form of tropical cyclones, as defined by their isobaric lines, is nearly circular. Our cyclones are, as a rule, less symmetrical, and their isobars are often elongated into an oval form. In the eastern United States the longer axis of the oval trends northeast, making a trough-like depression between the high pressure area over the tropical North Atlantic and the winter high pressure area of North America. In the North Atlantic the lowest pressure of the cyclone is commonly found south of the center of the outer isobaric ovals, thus giving steep gradients south of the center and weak gradients north of it; this is due to the occurrence of prevailing high pressures about the Azores and low pressures about Iceland. In the torrid zone, where the isobaric chart for

January or July shows a relatively uniform distribution of pressure, these causes of irregularity are absent.

NORTH ATLANTIC STORMS.

The paths of the following areas of low pressure with revolving winds on the Atlantic Ocean during January, 1894, have been approximately traced on daily charts of simultaneous observations based on data received up to the 25th of February, through the co-operation of the Hydrographic Office, U. S. Navy, and the "New York Herald Weather Service." The western portions of these paths are shown on Chart I.

A. January 1 a low area was central about N. 47°, W. 47°; on the 2d it was at N. 52°, W. 38°, and on the 3d, N. 55°, W. 20°; it had been preceded by an area of high pressure on the east which was central over Norway and Sweden on the 2d, 3d, and 4th, the maximum being 31.0 in southern Norway on the 3d, at Greenwich noon; this high area then became a long oval or ridge as it moved southeastward into Russia and disappeared in southeast Russia, or the Caspian Sea, by joining the high pressure over Asia; meanwhile low area A advanced slowly northeastward and was joined by B on the 7th.

B. Low area No. II of the U. S. series, passed from Labrador on the 4th to the Atlantic north of Newfoundland on the 5th, and was, on the 6th, central at about N. 55°, W. 35°, while minor depressions were central in the English Channel and the western Mediterranean, and the whole region between N. 35° and N. 65°, and E. 5° and W. 60°, was below normal pressure. On the 7th the lowest pressure was central about N. 60°, W. 30°, and the extensive depression over the North Atlantic extended southeastward over the Mediterranean. By noon of the 8th pressure had generally risen over the Mediterranean, but had fallen in western Ireland, and the central depression had moved southerly until on the 9th, at noon, it was central at N. 50°, W. 25°, and by noon of the 10th at N. 55°, W. 20°, while pressure was still rising in eastern Russia; this had now become the center of the general depression of the North Atlantic which had the form of a long oval or trough on the 10th, but had closed up considerably by the 11th, while a special depression, C, was forming to the westward.

C. This appeared as a moderate depression on the 11th off the south Atlantic coast which, by the 12th, had been joined by a more important depression (U. S. series No. XI) from the Lake region, and by the 12th, noon, C was central at N. 44°, W. 64°; on the 13th at N. 47°, W. 57°; 14th, at N. 50°, W. 40°; 15th, at about N. 55°, W. 40°. By this time B, which was near N. 58°, W. 15° on the 13th, had moved northward beyond our reports, and the isobar of 29.5 extended from the coast of Newfoundland to North Cape, its southwestern end inclosed the area C, while at its northeastern end area B was filling up; 16th, noon, the center of C was at about N. 57°, W. 27°; 17th, noon, N. 60°, W. 10°; 18th, noon, N. 62°, W. 3°, after which this area moved nearly due east across southern Norway and Sweden and was, on the 20th, central in northern Russia.

D. On the 18th, 19th, and 20th the pressure was comparatively high over the North Atlantic from Africa westward over the United States, while an area of low pressure moved eastward from Labrador north of the limit of our marine reports; it was central, approximately, on the 18th in N. 57°, W. 35°, on the 19th, N. 58°, W. 20°, and on the 20th, N. 58°, W. 6°, being then over northern Scotland. European reports for later date have not been received at the Weather Bureau.

E. Meanwhile pressure continued steadily rising over the Atlantic, and was above 30.5 from Labrador to the Azores on the 21st; this area of high pressure moved slowly south and east and dominated the Atlantic between W. 10° and 60°, N. 20° and 40°, until the 28th; during the 29th, 30th, and 31st pressure rose to 30.79, or higher, between the Azores and the coast of Africa and Portugal. On the 28th, noon, the depres-

sion (U. S. series No. XVIII) that had passed over the Gulf of Saint Lawrence on the 25th and moved rapidly northeastward stretched as a long oval from Iceland to North Cape, while a following depression, *F*, was central at N. 50°, W. 50°, near the coast of Labrador and Newfoundland. The barometer was at this time quite low over all of Europe north of N. 50°, but high over the Atlantic and the United States south of N. 40°.

F. This area (U. S. series No. XIX) seems to have developed on the 26th off the coast of the south Atlantic States as the result of the flow of cold northwest winds over the warm waters of the Gulf Stream; it had had a previous existence as an unimportant whirl in the Gulf southwest of Florida, having apparently been started on the southeast side of the norther that swept over the western portion of the Gulf on the 24th and 25th. On the 27th the center was about N. 41°, W. 68°; 28th, N. 48°, W. 50°; 29th, it was north of our stations and reports, but on the 30th the center must have been, approximately, N. 63°, W. 8°.

G. On the 29th, a. m., a depression (U. S. series No. XXI) was east of the south Atlantic coast moving northward; this also had a previous existence as an unimportant depression in the Gulf, having originated on the southeast side of the northerly winds that prevailed in the western Gulf on the 28th; it passed inward over Chesapeake Bay on the 29th, and by the 30th, noon, it had united with a depression coming from the west and constituted a violent storm central a little east of Boston; 31st, noon, the center was near the southern coast of Newfoundland, while the preceding area, *F*, was central near the southern coast of Norway. At this time the isobar of 29.9 passed from St. Petersburg southwest to northern Spain and Portugal, thence northwest to N. 55°, W. 20°, thence southwest to N. 37°, W. 55° and 60°, thence northwest to Quebec, and the entire region north of this line was dominated by the low areas *F* in the east and *G* in the west.

It has often been pointed out that the formation of a norther in Texas and the Gulf of Mexico is due sometimes to the unusual coldness and density of the air that is flowing southward from the Mexican and United States Rocky Mountain plateau region, but that sometimes also it must be due to a slight deficit of pressure in regions far to the south, as a

gradient of 0.01 of an inch per degree suffices to set the mobile atmosphere in rapid motion. In this connection the few reports that we have received from the southern portion of the Caribbean Sea are interesting, as they indicate that the pressure was about 0.1 of an inch, or 0.05 below the normal, in that region from January 15-22, but had risen to normal by the end of the month. A daily barometric report from the coasts of Venezuela, Central America, Guatemala, and Mexico would undoubtedly give a satisfactory basis for predicting the northers of the Gulf and the Caribbean Sea.

OCEAN ICE IN JANUARY.

The limits of the regions within which field ice or icebergs were reported for January, 1894, are shown on Chart I by crosses. The southernmost ice reported was in N. 44° 27', W. 54° 15', on the 18th, and the position of the easternmost ice was reported in N. 44° 48', W. 46° 14', on the 21st. More ice was reported during January, 1894, than in any corresponding month during the past 12 years. In 1893, on January 5, a large berg was noted in N. 47° 35', W. 48° 34'; on the 8th a long, low berg was observed in N. 48° 10', W. 47° 26'; on the 18th a berg was noted in N. 48°, W. 46°. In 1889 and 1892 no ice was reported. In 1891, on the 28th, 3 large icebergs were observed in N. 46° 30', W. 52° 46', and on the 31st patches of soft ice were encountered in N. 45° 50', W. 59° 20'. In 1890 vast fields of ice and enormous icebergs were encountered over and near the Grand Banks, north of the forty-third parallel. In 1882 to 1888, inclusive, Arctic ice in small quantities was reported east of Newfoundland, but in no case was it sighted south of the forty-third parallel.

OCEAN FOG IN JANUARY.

The limits of fog belts west of the fortieth meridian, as reported by navigators, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 9 dates; between the fifty-fifth and sixty-fifth meridians on 5 dates, and west of the sixty-fifth meridian on 4 dates. Compared with the corresponding month of the last six years the dates of occurrence of fog east of the fifty-fifth meridian numbered 2 more than the average; between the fifty-fifth and sixty-fifth meridians 4 less than the average; and west of the sixty-fifth meridian 2 less than the average.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The distribution of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the higher irregular surface of the Rocky Mountain plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; in mountainous regions such isotherms are controlled largely by the topography, and it is, therefore, not practicable to accurately present the temperature data in this manner unless a contour map on a large scale is published as a base chart.

NORMAL TEMPERATURE.

In the table of meteorological data from voluntary observers only the mean temperature is given for each station, but in the tables of climatological data for the regular stations of the Weather Bureau both the mean temperatures and the departures from the normal are given. In the latter table the stations are grouped by geographical districts, for each of which is given the average temperature and departure from the normal. The normal for any district or station may be

found by adding the departures to the current average when the latter is below the normal and by subtracting when it is above.

MONTHLY MEAN TEMPERATURE.

For the regular stations of the Weather Bureau the monthly mean temperature is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to the table of meteorological data.

During January, 1894, the mean temperature was highest at Key West, Fla. (71.0), and was above 60 in the Florida Peninsula and extreme southeastern coast of Louisiana and the extreme southern portion of Texas. The temperature averaged 32 in a zone passing from Cape Cod, Mass., through Long Island Sound, northern New Jersey, central Pennsylvania, northern Ohio and Indiana, southern Michigan, central Illinois and Missouri, southern Kansas, northern Texas, New Mexico, Arizona, portions of Nevada, Oregon, and Washington. The lowest average temperatures in the United States were between zero and -4.7 in the Red River Valley between Minnesota and North Dakota. The isotherm of -10 passes through Manitoba and Saskatchewan.

DEPARTURES FROM NORMAL TEMPERATURE.

As compared with the normal for this month temperatures were slightly deficient at the mouth of the St. Lawrence River and more so in North and South Dakota and still more so in Arizona and California; the maximum deficits were -4.2 at Tucson and San Diego. Excepting these small regions the greater portion of the country had a mean temperature decidedly above the normal; the maximum excesses were in the Mississippi and Ohio valleys and lower Lake region, where they ranged from +8.6 at Memphis, Tenn., to +4.2 at New Orleans, La.; +8.5 at Toronto, Ont.; +4.0 at Duluth, Minn.; +4.7 at Denver, Colo.; the temperatures in Alberta, Saskatchewan, and Assiniboia were also from 6 to 4 above the normal.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for January for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for January, 1894; (4) the departure of the current month from the normal; (5) the extreme monthly means for January and the years of their occurrence during the period of observation:

State and station.	(1) Normal for the month of Jan.	(2) Length of record.	(3) Mean for Jan., 1894.	(4) Departure from normal.	(5) Extreme monthly means for January.			
					Highest.	Year.	Lowest.	Year.
<i>Arizona.</i>	0	Years	0	0	0		0	
Fort Apache	34.9	22	32.8	- 2.1	39.8	1882	27.4	1874
Fort Mohave	51.5	21	.....	.....	56.4	1879, 93	44.0	1890
Whipple Barracks	35.4	22	31.8	- 3.6	40.7	1871, 93	27.5	1888
<i>Arkansas.</i>								
Keesees Ferry	33.3	12	39.3	+ 6.0	45.6	1890	24.2	1886
<i>California.</i>								
Riverside	50.8	12	47.3	- 3.5	54.6	1893	43.0	1890
<i>Colorado.</i>								
Las Animas	24.2	12	31.4	+ 7.2	34.6	1893	16.4	1885
<i>Florida.</i>								
Merritts Island	62.1	12	65.9	+ 3.8	69.8	1882	55.4	1886
<i>Georgia.</i>								
Forsyth	47.8	20	52.7	+ 4.9	59.4	1880	40.8	1884
<i>Idaho.</i>								
Boise Barracks	28.3	20	32.2	+ 3.9	39.2	1874	17.7	1888
Fort Sherman	25.2	10	.....	.....	34.4	1891	18.8	1890
<i>Indiana.</i>								
Lafayette	23.5	14	32.0	+ 8.5	41.3	1880	13.5	1893
<i>Iowa.</i>								
Cresco	9.5	22	15.0	+ 5.5	26.1	1880	- 1.3	1883
<i>Kansas.</i>								
Eureka Ranch	23.9	11	26.0	+ 2.1	31.0	1893	14.7	1886
Independence	29.1	22	32.3	+ 3.2	45.8	1880	18.6	1886
<i>Louisiana.</i>								
Grand Coteau	51.6	11	55.4	+ 3.8	64.0	1890	47.2	1892
<i>Maine.</i>								
Orono	15.7	19	12.4	- 3.3	24.7	1889	8.2	1875
<i>Maryland.</i>								
Cumberland	29.7	23	35.0	+ 5.3	40.7	1890	22.8	1893
<i>Michigan.</i>								
Kalamazoo	21.7	18	28.8	+ 7.1	36.0	1880	14.0	1881
<i>Missouri.</i>								
Sedalia	24.6	11	30.9	+ 6.3	35.6	1889	13.6	1887
<i>Montana.</i>								
Fort Custer	12.5	14	19.4	+ 6.9	28.6	1891	2.2	1886
<i>Nebraska.</i>								
Fort Robinson	21.8	9	20.4	- 1.4	29.4	1893	15.7	1890
Genoa (near)	16.4	18	17.9	+ 1.5	29.2	1880	5.0	1886
<i>Nevada.</i>								
Browns	31.3	23	.....	.....	39.6	1873	19.0	1888
Carson City	30.4	17	32.0	+ 1.6	37.0	1881	18.9	1890
<i>New Hampshire.</i>								
Hanover	17.3	23	20.3	+ 3.0	25.4	1889	6.8	1888
<i>New Mexico.</i>								
Deming	42.8	11	44.9	+ 2.1	50.4	1893	36.8	1883
Fort Wingate	30.1	23	31.2	+ 1.1	36.8	1877	23.8	1878
<i>New York.</i>								
Cooperstown	20.1	23	25.5	+ 5.4	31.6	1880	12.3	1875
Plattsburg Barracks	16.5	23	19.2	+ 2.7	27.4	1880	8.8	1893
<i>North Carolina.</i>								
Lenoir	35.9	22	41.3	+ 5.4	46.5	1890	27.3	1893
<i>Oklahoma.</i>								
Fort Reno	32.6	11	.....	.....	40.2	1893	23.0	1886
Fort Sill	36.0	22	37.7	+ 1.7	48.1	1880	25.7	1875
Fort Supply	29.7	15	30.2	+ 0.5	37.2	1893	19.7	1875
<i>Oregon.</i>								
Bandon	43.5	10	46.0	+ 2.5	48.8	1891	39.6	1888
<i>Pennsylvania.</i>								
Dyberry	21.4	23	26.6	+ 5.2	31.6	1890	14.1	1893
Grampian	22.8	23	30.2	+ 7.4	35.0	1880	15.0	1893
Wellsboro	24.7	14	28.6	+ 3.9	35.8	1890	15.8	1893

Departures from normal temperature—Continued.

State and station.	(1) Normal for the month of Jan.	(2) Length of record.	(3) Mean for Jan., 1894.	(4) Departure from normal.	(5) Extreme monthly means for January.			
					Highest.	Year.	Lowest.	Year.
<i>South Carolina.</i>	0	Years	0	0	0		0	
Statesburg	44.7	12	49.2	+ 4.5	54.6	1890	38.0	1893
<i>South Dakota.</i>								
Fort Sully	12.3	23	13.5	+ 1.2	30.3	1891	0.1	1875
<i>Texas.</i>								
Austin	47.8	22	53.1	+ 5.3	59.5	1880	40.0	1892
Silver Falls	41.0	8	41.6	+ 0.6	46.6	1890	36.2	1892
<i>Utah.</i>								
Terrace	22.6	22	28.9	+ 6.3	31.4	1872	9.8	1888
<i>Vermont.</i>								
Stratford	16.0	20	25.1	+ 9.1	25.4	1889	6.9	1888
<i>Virginia.</i>								
Dale Enterprise	32.0	14	36.4	+ 4.4	48.1	1890	20.7	1881
<i>Washington.</i>								
Fort Townsend	37.9	19	37.7	- 0.2	55.4	1888	30.3	1875
<i>West Virginia.</i>								
Parkersburg	31.1	13	37.0	+ 5.9	42.4	1890	21.9	1893
<i>Wisconsin.</i>								
Madison	15.9	23	20.6	+ 4.7	33.6	1880	4.1	1875
<i>Wyoming.</i>								
Fort Washakie	13.2	11	20.6	+ 7.4	29.6	1893	6.6	1888

YEARS OF HIGHEST MEAN TEMPERATURE FOR JANUARY.

The mean temperature for January, 1894, was not the highest on record at any reporting station during the current month, notwithstanding the fact that so large a region has enjoyed a temperature so decidedly above the normal. The distribution of temperature during the current month was, in fact, approximately, a combination, on a more moderate scale, of the distribution of high temperatures during the same month in 1880, 1890, and 1891.

YEARS OF LOWEST MEAN TEMPERATURE FOR JANUARY.

The mean temperature for January 1894, was the lowest on record at Tucson, Ariz., being 45.2, or 4.2 below the normal, the previous lowest being 45.4 in January, 1878; at San Diego, Cal., being 49.5, or 4.2 below the normal, the lowest previous temperature for January was 50.4 in 1882.

MAXIMUM TEMPERATURE.

The maximum temperatures at regular stations of the Weather Bureau are given in the table of climatological data, from which it appears that temperatures from 80 to 82 have been recorded at Corpus Christi and San Antonio, Tex., Key West, Tampa, Jupiter, and Titusville, Fla. Among the lowest maxima are: Moorhead, Minn., 38; Sault Ste. Marie, Mich., 40; St. Paul, Minn., 43; Huron, N. Dak., 42; Marquette, Mich., 45; Bismarck, N. Dak., 45; St. Vincent, Minn., 46; and Miles City, Mont., 46. This region of lowest maxima corresponds nearly to the interior region whose elevation is less than 2,000 feet above sea level.

MINIMUM TEMPERATURE.

The lowest temperatures recorded at regular stations of the Weather Bureau are given in the table of climatological data, from which the following are selected: Key West, Fla., 61; Jupiter, Fla., 49; Tampa, Fla., 41; Titusville, Fla., 40; Jacksonville, Fla., 36; Savannah, Ga., 32; Mobile, Ala., 24; New Orleans, La., 28; Galveston and Corpus Christi, Tex., 24; El Paso, Tex., 14; Tucson, Ariz., 18; Yuma, Ariz., 28; San Diego and Los Angeles, Cal., 32; San Francisco, Cal., 36. On the northern border the following are the lowest minima: Eastport, Me., -9; Sault Ste. Marie, Mich., -14; Marquette, Mich., -9; Duluth, Minn., -24; St. Vincent, Minn., -38; Williston, N. Dak., -36; Havre and Helena, Mont., -26; Spokane Falls, Wash., -1; Tatoosh Island, Wash., 30.

TEMPERATURE, JANUARY 1 TO 31, 1894.

For the period January 1 to 31, 1894, the average temperature was above the normal throughout the whole country,

except in the southern plateau, middle Pacific, and southern Pacific. In regions where the temperature was deficient the average deficit for the period was as follows: southern Pacific, 2.4; southern plateau, 1.8; middle Pacific, 1.7.

In regions where the temperature was in excess the average excess for the period was as follows; North Dakota, 0.1; Key West, Fla., 0.6; north Pacific coast, 1.1; northern slope, 2.0; middle plateau, 2.4; New England, 2.4; Missouri Valley, 2.5; south Atlantic States, 2.9; middle Atlantic States, 4.2; northern plateau, 4.6; Abilene, Tex. (southern slope), 4.7; east Gulf States, 4.7; upper Mississippi Valley, 4.9; middle slope, 4.9; west Gulf States, 5.3; upper Lake region, 5.4; lower Lake region, 6.3; Ohio Valley and Tennessee, 6.6.

DIURNAL PERIODICITY.

The regular diurnal period in temperature is shown by the hourly means given in meteorological table No. V for all stations having self-registers.

DAILY AND MONTHLY RANGES OF TEMPERATURE.

The greatest daily range of temperature is given for each of the regular Weather Bureau stations in Table I of climatological data from which the following are selected.

Greatest daily ranges.—Havre, Mont., 59; Huron, S. Dak., 56; Williston, N. Dak., and Pueblo, Colo., 52; Cheyenne, Wyo., 50.

Smallest daily ranges.—Key West, Fla., Fort Canby and Tatoosh Island, Wash., 13; Eureka, Cal., 16; San Francisco, Cal., 17; Port Eads, La., 18; Hatteras, N. C., 19; Woods Holl, Mass., 20. Daily ranges of about 40 or more were reported from the greater portion of Montana, North and South Dakota, Wyoming, Colorado, and small portions of Kansas, Nebraska, Iowa, Missouri, and Minnesota.

Monthly ranges of 60 or more were reported from the region inclosed by the states of Montana, Wyoming, Colorado, Texas, Ohio, and Wisconsin.

Largest monthly ranges.—Columbia, Mo., 90; Concordia, Kans., 89; Springfield, Mo., 87; Keokuk, Iowa, and Hannibal, Mo., 85.

Smallest monthly ranges.—Key West, Fla., 19; Fort Canby, Wash., 21; San Francisco, Cal., 22; Hatteras, N. C., 29; Tatoosh Island, Wash., 30.

LIMITS OF FREEZING TEMPERATURE.

The southern limit of the region within which the air has had a freezing temperature at some time during the month is approximately shown by the full and dotted lines on Chart V, joining the places at which the minimum temperatures of 32° and 40°, respectively, occurred within the instrument shelters of the Weather Bureau; the latter minimum is usually accompanied by a more or less severe frost on the ground outside of the shelter. During January, 1894, the line of minimum 40° crosses the northern portion of the peninsula of Florida just above the stations of Tampa and Titusville; it does not reappear either on the Gulf or the California coast within the limits of the United States. The line of minimum 32° passes from Savannah, Ga., southwest to near Apalachicola, in northern Florida; it reappears on the Pacific coast at San Diego, and leaves that coast between San Francisco and Eureka, Cal., at N. 40°.

PERIODS OF HIGH TEMPERATURE.

The most interesting period of high temperature began on the 11th and 12th in Oregon and Washington; it extended eastward on the 13th over Idaho, Montana, and North Dakota; on the 14th and 15th it prevailed over Lake Superior, Wyoming, Utah, and Colorado; on the 16th the highest temperatures of the month occurred in northern Texas, Oklahoma, Arkansas, Kansas, Nebraska, and Iowa; on the 17th, in Missouri, Illinois, Indiana, and Michigan; this warm

period disappeared on the 18th with a few maxima in Louisiana and Pennsylvania.

PERIODS OF LOW TEMPERATURE.

The first part of January was remarkably cold in California; the minimum temperatures generally occurred on the 6th, but a few on the 5th or 7th.

The most extensive period of low temperature began on the 23d, in Montana; the minimum for the month occurred on the 24th in North and South Dakota, Minnesota, Nebraska, Kansas, Oklahoma, and northern Texas; on the 25th in Upper and Lower Michigan, Wisconsin, Illinois, Indiana, Ohio, Kentucky, Tennessee, Alabama, Mississippi, Louisiana, and southern Texas; 26th, in western New York, Pennsylvania, Maryland, Delaware, New Jersey, Virginia, North and South Carolina; this cold wave disappeared on the 27th and 28th on the south Atlantic coast. A special bulletin was published by order of the Chief of the Weather Bureau on January 24, at 10.45 a. m., as follows:

The cold wave which was reported in the extreme Northwest on Saturday last has moved slowly to the southeast, and now covers the Mississippi Valley and the region westward to the Rocky Mountains.

The low temperatures attending this cold wave are unusual, especially in the Southwest, including northern Texas, Oklahoma, Indian Territory, and Arkansas, where the temperature is lower this morning than it has been for many years.

It is 8° below zero in Oklahoma. It is 8° above zero at Palestine, Tex. It is below freezing on the Texas coast. It is 10° below zero at St. Louis, Mo., and the temperature has fallen from 35° to 45° in Missouri in the past 24 hours. It is from 30° to 48° below zero in the Northwest, but the temperature is rising in Montana.

This cold wave will extend eastward over the Atlantic coast Thursday, preceded by rain or snow, and followed by fair and very cold weather Thursday and Friday.

AREAS OF 20° FALL IN TWENTY-FOUR HOURS.

A fall of 20° or more in temperature in twenty-four hours is known in the Weather Bureau forecasts as a cold wave, provided the temperature falls below 40° F. These falls in temperature are computed from observations twenty-four hours apart and are, therefore, largely independent of the regular diurnal variation of temperature; they may be divided into 2 classes: (1) those due to the clearing away of cloudy skies and the fall of temperature due to the consequent local radiation at the station; (2) those due to the advent of cold winds usually called a cold wave; the latter areas of low temperature are usually persistent for several days; they form on the east side of the Rocky Mountains in British America and advance southward and eastward over the country with a well-defined front, sometimes attended by snow squalls, when they are called blizzards, and sometimes by severe dry northerly winds, when they are called northers. The cold layer of air is often comparatively shallow; it does not easily push up over the Rocky Mountain plateaus of the United States or Mexico, but frequently surmounts the lower portions of the Appalachian range and descends upon the middle and east Atlantic coasts.

The following list gives all the regions inclosed by heavy dotted lines on the published Daily Weather Maps for January as having experienced falls of 20° in twenty-four hours. The area covered in each case is shown by the dimensions in miles; when one of the dimensions is left blank it will be understood that the region extended beyond the limits of our stations:

(A) 1st, 8 p. m., over an area 500 by 250 miles in western Montana, Alberta, and Assiniboia. 2d, 8 a. m., about 600 miles in diameter, the southeastern edge being in the western portion of South Dakota; 8 p. m., about 800 by 400 miles, the southern edge being in western and central Nebraska. 3d, 8 a. m., broken up into two small areas of 300 by 200 miles, the southern edge being still in Nebraska; 8 p. m., one small area left, 300 by 200 miles, the southern edge covering central

Kansas. 4th, 8 a. m., 200 by 150 miles, in southeast Minnesota and western Wisconsin.

(B) 4th, 8 p. m., 250 by 200 miles, in western Montana and southern Alberta. 5th, 8 a. m., 500 by 300 miles, in western Alberta and Assiniboia; 8 p. m., 800 by 300 miles, from Manitoba south to Colorado and western Nebraska. 6th, 8 a. m., 250 by 400 miles, over Colorado, northern Texas, western Kansas, and Nebraska; 8 p. m., 350 by 200 miles, over Oklahoma and northeastern Texas.

(C) 5th, 8 a. m., 500 by — miles, covering Ontario. 5th, 8 p. m., 300 by — miles, covering New Brunswick and the mouth of the St. Lawrence. 6th, 8 a. m., 300 by 400 miles, covering Maine, Nova Scotia, and New Brunswick.

(D) 5th, 8 p. m., 400 by 100 miles, in the Ohio Valley.

(E) 6th, 8 a. m., 250 by — miles, in Alberta and Saskatchewan. 6th, 8 p. m., the cold area was partly annulled by warm weather and then immediately followed by a decided fall. 7th, 8 a. m., 700 by 300 miles, covering Minnesota, Wisconsin, and northern Illinois.

(F) 8th, 8 a. m., about 200 by 400 miles, over western Virginia, North Carolina, and northern Georgia.

(G) 9th, 8 p. m., 300 by 250 miles, over Oklahoma and northeastern Texas.

(H) 10th, 8 a. m., 300 by — miles, over New Brunswick and the mouth of the St. Lawrence River.

(I) 10th, 8 p. m., 300 by 200 miles, over northwest Montana and southern Alberta. 11th, 8 a. m., 650 by 450 miles, covering Montana, eastern Wyoming, and western Nebraska; 8 p. m., 400 by 300 miles, over southern Minnesota and northern Iowa.

(J) 11th, 8 p. m., 700 by — miles, over Manitoba and northern Lake Superior. 12th, 8 a. m., 500 by — miles, over Lake Huron and northward; 8 p. m., 600 by — miles, over the St. Lawrence Valley and New England. 13th, 8 a. m., 300 by 200 miles, over Maine and the lower St. Lawrence Valley.

(K) 14th, 8 a. m., 400 by — miles, over Alberta and western Assiniboia; 8 p. m., 1,100 by — miles, over Alberta to Manitoba and northward. 15th, 8 a. m., in Manitoba; 8 p. m., 300 by — miles, north of Lake Superior. 16th, 8 a. m., north of Lake Superior and Lake Huron; 8 p. m., north of lakes Huron and Ontario. 17th, 8 a. m., 800 by — miles, covering northern New England, Nova Scotia, Cape Breton, New Brunswick, the St. Lawrence, and northward.

(L) 17th, 8 a. m., 100 by 200 miles in Manitoba; 8 p. m., 200 by 400 miles over Manitoba and northern Minnesota; also 200 by 500 miles over eastern Kansas, Nebraska, and western Iowa. 18th, 8 a. m., about 300 by 1,500 miles over eastern Colorado, northern Texas, eastern Kansas, western Missouri, Iowa, Minnesota, and Manitoba; 8 p. m., about 500 by 300 miles over Missouri and Illinois. 19th, 8 a. m., about 1,000 by 200 miles from southern Illinois northeast to Lake Huron and beyond; 8 p. m., 100 by 400 miles over northern New England and New Brunswick. 20th, 8 a. m., 800 by 300 miles over eastern New York, Vermont, New Hampshire, Maine, New Brunswick, and the St. Lawrence Valley.

(M) 19th, 8 a. m., 500 by 300 miles over Alberta, Assiniboia, Saskatchewan; 8 p. m., 300 by 200 miles over western Montana, Assiniboia, and Manitoba; 20th, 8 a. m., 200 by 400 miles over Manitoba; 8 p. m., 100 by — miles over Manitoba.

(N) 20th, 8 p. m., 200 by 300 miles over portions of Montana, Alberta, and Assiniboia; 21st, 8 a. m., 100 by 800 miles over South Dakota and southern Montana; 8 p. m., 1,300 by 300 miles over North and South Dakota, eastern Nebraska, Lake Superior, and portions of Minnesota, Wisconsin, and Iowa. 22d, 8 a. m., 1,500 by 300 miles over eastern Colorado, Kansas, Nebraska, Iowa, Wisconsin, Lake Superior, and portions of Ontario; 8 p. m., the large area is broken up into three parts, viz, 100 by 300 miles over Oklahoma and northern

Texas; 100 by 200 miles over Missouri and Illinois; 700 by — miles over Ontario and Quebec. 23d, 8 a. m., 700 by — miles over the St. Lawrence and New Brunswick.

(O) 21st, 8 a. m., 800 by 400 miles in the lower Mississippi valley.

(P) 22d, 8 p. m., 100 by 200 miles in western Montana. 23d, 8 a. m., 100 by 600 miles over western Montana and central Wyoming; 8 p. m., 400 by 1,100 miles over Wyoming, Idaho, eastern Colorado, western Nebraska, western Missouri, Kansas, Oklahoma, and northern Texas. 24th, 8 a. m., 1,400 by 700 miles over eastern Colorado and New Mexico, northeastern Mexico; Texas, Oklahoma, Arkansas, Missouri, Illinois, portions of Louisiana, Kansas, and Iowa. 24th, 8 p. m., 1,500 by 500 miles over southern Texas, northeast Mexico, the western portion of the Gulf of Mexico, Louisiana, Mississippi, Alabama, Arkansas, Tennessee, Kentucky, Illinois, Indiana, Ohio. 25th, 8 a. m., 1,400 by 400 miles over Mississippi, Alabama, Tennessee, Kentucky, Ohio, Ontario, and portions of Georgia, Indiana, West Virginia, Pennsylvania, New York, and Michigan; 8 p. m., 1,200 by 500 miles over South Carolina, North Carolina, Virginia, Maryland, Delaware, New Jersey, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine, and portions of Pennsylvania, New York, Ontario, New Brunswick, Nova Scotia, and the ocean between this shore line and the Gulf Stream. 26th, 8 p. m., the large area divided into two portions, viz, 200 by 100 miles on the coast of South Carolina, and 500 by — miles over New Brunswick, Nova Scotia, and the Gulf of St. Lawrence.

(Q) 29th, 8 a. m., 500 by 200 miles over portions of North and South Dakota, Minnesota and Nebraska; 8 p. m., 200 by 100 miles over northern Illinois and Indiana; 30th, 8 a. m., 300 by 100 miles over northern Indiana and Ohio.

(R) 30th, 8 a. m., 100 by 100 miles in the Florida Peninsula.

(S) 29th, 8th p. m., 200 by — miles in Alberta. 30th, 8 a. m., 500 by 200 miles over portions of Montana, Assiniboia, and Saskatchewan; 8 p. m., 600 by 300 miles over eastern Wyoming, northern Colorado, western portions of North Dakota, South Dakota, Nebraska, and Kansas. 31st, 8 a. m., 300 by 150 miles over portions of Manitoba, North Dakota, and Minnesota; 31st, 8 p. m., 800 by 200 miles over northern Texas, Oklahoma and Indian Territory, central Missouri and Illinois.

(T) 31st, 8 p. m., 400 by — miles over the southern coast of the Gulf of St. Lawrence.

AGRICULTURE AFFECTED BY TEMPERATURE.

The following records of cold and warm periods are taken from the reports of the State Weather Services:

Alabama.—The coldest weather occurred during the night of the 24th; at Montgomery, about 2 p. m., the wind rapidly increased to 30 miles per hour from the northwest, with a rapid fall in temperature, and by the morning of the 25th temperature had fallen 44° to the minimum of 21°. In some places strawberry plants and young cabbages were destroyed, but young oats fared better, only those in the bud being killed. The approach of this cold wave was amply foretold by the Weather Bureau in a general warning on the night of the 23d, which was repeated to all regular display stations in the State; it is thought that this warning saved many thousands of dollars.

Arkansas.—The chief meteorological feature of the month was the cold wave of the 24th, which was the most severe for fifteen years, except that of January 9, 1886.

California.—Anderson.—The month has been cold and frosty. Clipper Mills.—The first portion of the month was very cold and injurious to young grass. Cornwall.—The frosts of the early part of the month kept the crops back. Colegrove.—From the 4th to the 10th and on the 17th a light white frost was observable in the early morning; even light frost is quite unusual here; in exposed places the tender growth on tomato vines was somewhat touched. Escondido.—Quite a cold snap during the first half of the month; the only citrus trees damaged were the few that were situated in the lowest places; it was the longest cold snap for years; vegetables are backward owing to chilling weather. Fall Brook.—The number of frosts in January, 1894, was 16, and greater than the aggregate for the past six Januaries; in the past sixteen years the greatest number of frosts for any one January was 7, and in four Januaries there were no frosts. Jolon.—Frost and freezing

weather nearly all the month. Lemoore.—Unusually cold weather, such as was never experienced here before. North Hill Vineyard.—The first killing frost was on the 25th. Pasadena.—The lowest average temperature ever known here; the extreme cold lasted only a very short time; tender plants were cut down, but no damage to oranges. Red Bluff.—A little wetter and cooler than the average; fine growing weather. Sacramento.—The month has been remarkably cold; ice $\frac{1}{2}$ of an inch thick on the mornings of the 4th, 5th, 9th, 10th, and 19th, $\frac{1}{4}$ of an inch on the 6th, and $\frac{1}{8}$ of an inch on the morning of the 7th. San Jose.—The month is noted for one of the coldest nights for years; minimum temperature, 18°, on the morning of the 6th; the previous lowest was 22°; flowers and shrubs were injured more than usual in this valley. Santa Cruz.—Ground frozen slightly on the 3d, and very hard on the 5th and 6th; ice $\frac{1}{2}$ of an inch in thickness; calla lilies and tender plants frozen to the ground. San Ardo.—More killing frost than usual; the sowing of grain will not be finished before March 1. Santa Barbara.—The month was unusually cold; frosts on eleven mornings and ice on six, but only delicate plants were injured. Santa Maria.—Cold and frosty until the 20th; grain coming up slowly. Turlock.—Ice on the mornings of the 5th, 6th, 8th, 9th, 10th, 11th, 12th, and 18th; mean monthly temperature about the same as last year; comparatively few entirely foggy days; grain is not much, if any, further advanced than last year, but is in better condition. Tehachapi.—The first part of this month was the coldest for years. Ventura.—The coldest month known in this county; there was more frost than usual, but not of the killing kind.

Illinois.—A severe cold wave prevailed over the State on the 24th and 25th, but owing to the snow that had fallen during the two preceding days the wheat was well protected from the intense cold.

Iowa.—Blizzards were reported at Grand Meadow on the 11th; at Carroll, Greenfield, and Rockwell City, on the 23d; the lowest temperature occurred at Amana on the 25th.

Louisiana.—The marked feature of the weather of January, 1894, was the cold wave of the 24th to 26th that caused temperature falls of 30° to 40° in all portions of the State; this had been heralded by warnings sent broadcast by telegraph, telephone, and mail. The lowest temperature in northern Louisiana was 12°, in southeastern Louisiana, at Port Eads, 40°, and at New Orleans, 28°. Garden vegetables were injured and possibly some slight injury to orange trees, but severe injury was sometimes prevented by smudge fires and other preparations for the expected freeze. The cold wave was ushered in by a northwest wind of about 30 miles per hour at New Orleans on the 24th and 25th, and a velocity of 34 miles per hour, preceded by rain and thunder at Port Eads on the 24th. At Wallace, at 7.15 a. m. of the 24th, the observer experienced first a dense fog bank and calm and then distinctly heard a sound like that of a tornado moving from the southwest toward the northeast, after which the wind at his station suddenly became very high and hail fell for a few seconds. [The general weather map shows that at this time the front of the cold wave was passing over the station at Wallace and the noise heard by the observer was very likely due to a whirl in the cloud region above him, since the front is generally characterized by a series of small violent whirls, sometimes horizontal, sometimes vertical.]

Minnesota.—Blizzards were reported on the 21st and 23d at Milan; 11th and 21st, Barrett; at Belle Plaine on the night of the 10-11th; Warren on the 20th.

Mississippi.—The coldest day was the 25th, every station recording its lowest temperature on that date; this cold wave was the principal meteorological feature of the month; timely notice of its approach was given by the Weather Bureau in warnings telegraphed broadcast throughout the State.

Montana.—Cold waves occurred on the 2d, in the eastern portion of the State; on the 5th general cold weather prevailed, followed by a decided warm wave that remained until the 21st; 21st-23d, a general cold wave; slowly rising temperature in western Montana from the 23d to the end of the month.

New England.—The month was 2° to 5° above normal temperature in the southern, but several degrees colder in the extreme northern part. The observer at Fort Kent in northern Maine reports: "we have had extremely cold weather during January and my minimum thermometer has failed to record it; it is graduated only to -35°, and frequently I have found the index in the bulb while all the other thermometers in town recorded 45° to 50° below zero."

Oklahoma.—Oklahoma.—The second cold period prevailed from the 22d to the 27th; the lowest temperature was 8° below zero on the morning of the 24th; this cold wave was accompanied by possibly the worst blizzard ever experienced in this region. Lehigh, Choctaw Nation.—The first blizzard of the winter occurred on the 24th. Gwendale, Cherokee Nation.—A regular Dakota blizzard suddenly visited us on the 23d and 24th; the night of the 23d-24th was one of the coldest ever experienced here, the minimum was 3° above zero; the brisk winds drifted the snow so badly that it was impossible to get an accurate measurement. Clifton.—The storm of the 23d was a furious blizzard, and for the first two or three hours the precipitation was solid ice, sleet, or hail. Anadarko, Kiowa Nation.—The snow on the 23d was very dry, with a hard northeast wind, estimated about 4 inches. Haulton, Chickasaw Nation.—High south wind on the 23d followed by a blizzard on the 24th. Kemp.—Light snow on the 23d, temperature fell rapidly with the approach of the norther of the 24th.

Ohio.—The warm wave from the 1st to 11th culminated on the 4th, and that of the 13th to 23d culminated on the 18th and 21st with the highest mean daily temperatures of the month. On the 24th and 25th temperatures had fallen within twenty-four hours by from 30° to 50° under the advance of the

most severe cold wave of the season. This cold wave first appeared to the north of Montana on Friday, 19th, and timely warnings were issued to all stations throughout the central valleys and Atlantic coast states.

Tennessee.—The cold wave of the 24-25th was the most severe since 1886; warnings of its approach were widely distributed throughout the State; it was more beneficial than damaging.

Utah.—The coldest days were generally the 5th, 6th, 9th, and 10th, and the warmest day was generally either the 15th or the 29th.

Washington.—Taking the State as a whole the mean temperature has been normal, but the rainfall has been the greatest since 1890, and the number of rainy days has been greater than for several years past; there was a cold snap from the 4th to 6th and a very warm period from the 12th to 14th.

Wisconsin.—The first twenty-two days were unusually warm; a severe cold wave entered the State during the night of the 21st-22d, and abnormally low temperatures prevailed from the 22d to the end of the month.

Wyoming.—The month has been noted for storms in the mountains; the observer at Sheridan reports storms from the northwest on the 18th and 23d.

FROST.

The following table shows the dates of the occurrence of the first light frost, the first heavy frost, and the first snow-fall at the respective stations:

Dates of first light and heavy frosts and snow, January, 1894.

State and station.	First frost.			State and station.	First frost.		
	Light.	Heavy.	Snow.		Light.	Heavy.	Snow.
Alabama.				Kentucky—Continued.			
Florence			24	Louisville			25
Greensboro			26	Pellville			24
Selma			27	Princeton			23
Arizona.				Louisiana.			
Antelope Valley			4	Bastrop			24
Bisbee			4	Coushatta			25
Calabasas			5	Farmersville			24
Dudleyville			5	Liberty Hill			24
Eagle Pass			5	New Orleans			2
Natural Bridge			3	Plain Dealing			24
Keymer			4	Mississippi.			
Rye			4	Agricultural College			24
St. Helena Ranch			4	Clarksdale			24
Yuma			4	Greenville			24
Arkansas.				Itta Bena			24
Ashdown			24	Pontotoc			24
Bee Branch			24	Thornton			24
Blanchard Springs			24	Vicksburg			24
Camden			24	North Carolina.			
Conway			24	Shelby			26
Dardanelle			24	Oklahoma.			
Mount Nebo			21	Anadarko			23
Newport			24	Fort Sill			23
Osceola			24	Keokuk Falls			23
Ozark			24	Mangum			23
Rison			24	Winnview			23
Rogers			23	Oregon.			
Russellville			24	Albany			3
Winslow			23	Arlington			21
California.				Cornelius			3
Arcata			4	Corvallis			3
Chino			6	Jacksonville			3
Crescent City			4	Mount Angel			4
Folsom City			5	Umatilla			6
Jackson			2	South Carolina.			
Kennedy Gold Mine			3	Hollands Store			26
Los Angeles			6	Tennessee.			
Milton (near)			5	Andersonville			24
Mokelumne Hill			2	Clinton			25
Newcastle			5	Jackson			24
Red Bluff			20	Kingston			27
Redding			6	London			25
San Diego			16	Texas.			
San Francisco			5	Aurora			23
Sutter Creek			2	Corpus Christi			24
Ukiah			18	Galveston			1
Florida.				Grape Vine			10
Amelia			131	Haskell			23
Deland			30	Highland			23
Indian Territory.				Mountain Springs			23
Eufaula			23	Weatherford			23
Kentucky.				Wichita Falls			23
Fords Ferry			24				

* Exposed vegetables and plants injured.

† Heavy frost in Mission Valley; vegetables injured.

‡ Strawberries injured.

COLD WAVES.

The following special notes by Weather Bureau observers relative to the cold wave of January 23-24 are arranged geographically and chronologically so as to give an approximate idea of the progress of the front of the cold wave:

South Dakota.—Huron, 23d, snow began during the early morning and continued until 5.40 p. m., with brisk northwest winds. Trains delayed by drifting snow.

Kansas.—Dodge City, 23d-24th, the most severe norther that has visited this section in several years. At 8 p. m. of the 23d the temperature had fallen to -4, and by the morning of the 24th to -15.

Missouri.—St. Charles, 24-25th, the cold wave reported injurious to peaches. At Olden the temperature fell to -11. Fifty per cent of the peach buds killed.

Illinois.—Springfield, 23d-24th, snow began at 12.40 p. m., 23d, and continued until 4 a. m., 24th, during which time 5.5 inches fell. The storm was the heaviest in years, and owing to high wind drifted badly. The midnight train of the Illinois Central Railroad did not leave until 8 a. m., 24th. Delay was caused to traffic.

Indiana.—Laconia, 24-25th, the cold wave killed all peaches.

Michigan.—Grand Haven, 24th, the heaviest snowstorm of the winter prevailed all day, the snow falling at times in blinding sheets driven by a high northwest wind, which set in shortly before noon. The snow drifted in many places to a depth of nearly 2 feet. Railroad traffic interrupted.

Ohio.—Cincinnati, 24th, rain began in the early morning and changed to snow at 7.50 a. m., with rapidly falling temperature; snow ended at 12.55 p. m. The suddenness and severity caused much suffering, and business was partially paralyzed.

Tennessee.—Nashville, 24th, rain began at 3 a. m.; sleet began at 7.45 a. m., and changed to snow at 9.55 a. m., ending at 11 a. m.; beginning again at 11.40 and ending at 4.15 p. m. From 4 to 11 a. m. the temperature fell 42; considerable damage to telephone wires by sleet. Florence, 24th, the cold wave damaged wheat and winter oats. Covington, 25th, the temperature fell to zero; peach crop seriously damaged. At Nunnely the temperature fell to -4; stock of all kinds suffered.

Texas.—State Weather Service, 23d-24th, the storm of sleet and snow was

general throughout Texas, and in some places the weather was the coldest on record. Abilene, 24th, severe cold wave, with snow and high winds reaching a maximum velocity of 30 miles northwest; stock frozen. Terrell, 23d-24th, heavy rain began the afternoon of the 23d and changed to sleet at night; the wind blew a gale from the north; minor damage reported. Bonham, the blizzard struck this place at 5 p. m., 23d; rain and sleet fell, with high wind, and by the morning of the 24th the temperature fell to zero. At Whitewright a sleet and snowstorm began at 5.30 p. m. and lasted one hour; the wind continued all night from 30 to 40 miles per hour; minor damage. Luling, 24th, severe cold wave; oats and vegetables killed. San Antonio, 24th, a severe cold wave, with high north winds; temperature fell to 18; fruit trees and early vegetables badly damaged, and stock on ranges perished. Galveston, 24th, a severe norther occurred in the early morning with a maximum velocity of 50 miles per hour; a few hailstones fell at 3 a. m.; the first heavy frost of the season occurred in the morning. Corpus Christi, 24th, a severe norther struck here about midnight, followed by rain and freezing temperature; the temperature fell 46 from 8 p. m., 23d, to 8 a. m., 24th; the cold continued until the 25th, and the minimum at 8 a. m. of that date was 24, the coldest since January, 1888; all fruits, vegetables, and flowers killed; no estimate made of damage.

Louisiana.—State Weather Service, the cold wave of the 24-26th, injured garden vegetables and strawberries, and caused slight damage to cane; some fall-sown oats reported killed in northern portion. Abbeville, 24-27th, the severe cold froze garden plants and injured fruits. Roseland, 25th, a severe freeze; radishes, strawberries, and sprouts on fig trees killed. Coushatta, 25th, heavy frost killed oats.

Alabama.—State Weather Service, 25th, the cold wave caused strawberry plants and young cabbages to be destroyed.

PRECIPITATION.

[In inches and hundredths.]

The distribution of precipitation over the United States and Canada for January, 1894, as determined by reports from about 2,000 stations, is exhibited on Chart III. In the meteorological tables the total precipitation is given for each station; the departures from the normal are given for regular stations of the Weather Bureau in Table I of climatological data. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

NORMAL PRECIPITATION.

In January the monthly precipitation on the Pacific coast is usually greatest on the coasts of Washington and Oregon, where it exceeds 8.00. On the Atlantic coast the heaviest normal precipitation for this month is on the coast of North Carolina near Cape Hatteras. The precipitation is usually less than 2.00 over the interior region between the upper Lakes, Texas, and Idaho.

PRECIPITATION FOR JANUARY, 1894.

In January, 1894, the monthly precipitation exceeded 10.00 at a majority of the stations on the coasts of Washington, Oregon, and northern California, and exceeded 20.00 on the immediate coast of Oregon; it was between 4.00 and 6.00 in the interior of the eastern Gulf and south Atlantic States, and was less than 2.00 over the Lake region.

DEPARTURES FROM NORMAL PRECIPITATION.

The precipitation for January was in excess of the normal on the northern plateau, at Abilene, Tex., Missouri Valley, north and middle Pacific coasts, and middle plateau. It was generally deficient throughout the United States south of N. 45° and east of the Pacific slope. The principal deficits were: New Orleans, La., 3.6; Narragansett Pier, R. I., 3.3; Augusta, Me., 2.8; Savannah, Ga., 2.6; Chattanooga, Tenn., 2.5, and Montgomery, Ala., 2.4. The principal excesses were: Astoria, Oreg., 3.8; Tatoosh Island, Wash., 3.2; Walla Walla, Wash., and Eureka, Cal., 2.8.

Considered by districts the monthly precipitation for Jan-

uary, 1894, when compared with the normal for the month, furnished the following percentages (the precipitation is in excess when the percentage of the normal exceeds 100): Northern plateau, 189; Abilene, Tex. (southern slope), 132; Missouri Valley, 123; middle Pacific coast, 121; north Pacific coast, 120; middle plateau, 106; northern slope, 100; upper Lake region, 90; upper Mississippi, 85; North Dakota, 84; lower Lake region, 81; New England, 80; east Gulf States, 70; Ohio Valley and Tennessee, 69; south Atlantic States, 68; middle Atlantic States, 67; west Gulf States, 65; Key West, Fla., 57; south Pacific coast, 56; southern plateau, 24; middle slope, 22.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for January for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for January, 1894; (4) the departure of the current month from the average; (5) the extremes for January and the years of occurrence during the period of observation:

State and station.	(1) Average for the month of Jan.	(2) Length of record.	(3) Total for Jan., 1894.	(4) Departure from average.	(5) Extremes for January.			
					Greatest.		Least.	
					Am't.	Year.	Am't.	Year.
<i>Arizona.</i>	<i>Inches.</i>	<i>Years.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>		<i>Inches.</i>	
Fort Apache	1.21	18	1.24	+ 0.03	3.90	1886	0.18	1878
Fort Mohave	0.73	22	.....	.....	4.15	1889	0.00	"
Whipple Barracks	1.39	22	0.30	- 1.09	5.99	1886	0.00	1891
<i>Arkansas.</i>								
Keesees Ferry	2.81	12	1.84	- 0.97	7.37	1890	0.50	1893
<i>California.</i>								
Riverside	1.50	13	0.99	- 0.51	4.28	1890	0.00	1891
<i>Colorado.</i>								
Las Animas	0.29	12	0.00	- 0.29	0.85	1891	0.00	1893, '94
<i>Florida.</i>								
Merritts Island	3.28	16	1.63	- 1.65	10.45	1878	0.42	1892
<i>Georgia.</i>								
Forsyth	4.91	20	.16	- 0.75	10.08	1883	2.22	1880
<i>Idaho.</i>								
Boise Barracks	2.25	20	2.88	+ 0.63	4.60	1872	T.	1889
Fort Sherman	2.90	11	8.70	+ 5.80	8.70	1894	0.85	1893
<i>Indiana.</i>								
Lafayette	2.23	14	2.19	- 0.04	6.11	1880	0.40	1881
<i>Iowa.</i>								
Cresco	1.32	22	0.99	- 0.33	3.72	1886	0.38	1872, '84

Departures from average precipitation—Continued.

State and station.	(1) Average for the month of Jan.	(2) Length of record.	(3) Total for Jan., 1894.	(4) Departure from average.	(5) Extremes for January.			
					Greatest.		Least.	
					Am't.	Year.	Am't.	Year.
Kansas.	Inches.	Years	Inches.	Inches.	Inches.		Inches.	
Independence	1.61	22	3.38	+ 1.77	3.38	1894	0.17	1893
Louisiana.								
Grand Coteau	6.27	11	4.30	- 1.97	13.30	1883	2.52	1887
Maine.								
Orono	4.72	22	3.01	- 1.71	7.66	1891	2.00	1875
Maryland.								
Cumberland	2.14	22	1.22	- 0.92	3.90	1878	0.30	1887
Michigan.								
Kalamazoo	2.26	18	1.57	- 0.69	4.90	1876	1.10	1879
Missouri.								
Sedalia	1.97	15	2.86	+ 0.89	4.01	1885	0.19	1881
Montana.								
Fort Custer	0.83	14	0.93	+ 0.10	2.85	1884	0.08	1885
Nebraska.								
Fort Robinson	0.60	10	0.61	+ 0.01	1.56	1892	0.06	1888
Genoa (near)	0.93	18	0.59	- 0.34	2.68	1891	0.19	1893
Neveda.								
Brown	0.68	23			3.22	1875	0.00	1872 '73
Carson City	2.37	17	2.33	- 0.04	6.78	1875	0.10	1889, '91
New Hampshire.								
Hanover	2.88	23	2.16	- 0.72	4.82	1887	0.45	1871
New Mexico.								
Deming	0.41	11	0.05	- 0.36	1.09	1889	0.00	1885, '87
Fort Wingate	1.11	22	0.55	- 0.56	3.30	1872	0.16	1881
New York.								
Cooperstown	2.59	23	2.84	+ 0.25	5.54	1891	0.52	1872
Plattsburg Barracks ..	1.80	23	2.04	+ 0.24	4.30	1892	0.59	1888
North Carolina.								
Lenoir	4.39	22	2.61	- 1.78	9.60	1878	1.10	1890
Oklahoma.								
Fort Reno	0.86	9	1.51	+ 0.65	2.04	1890	0.00	1887
Fort Sill	1.17	22	1.70	+ 0.53	3.80	1891	0.00	1871, '87
Fort Supply	0.61	15	0.25	- 0.36	2.67	1891	0.00	1887
Oregon.								
Bandon	10.92	16	23.07	+12.15	23.07	1891	4.60	1884
Pennsylvania.								
Dyberry	3.15	23	1.95	- 1.20	5.65	1892	0.70	1872
Gramplan	3.76	23	3.15	- 0.61	5.47	1888	1.21	1872
Wellisboro	6.14	14	2.25	- 3.89	12.17	1885	1.95	1890
South Carolina.								
Statesburg	3.69	12	2.27	- 1.42	6.65	1892	0.90	1890
South Dakota.								
Fort Sully	0.46	23	0.75	+ 0.29	1.03	1887	T.	1872
Texas.								
Austin	2.35	22	1.45	- 0.90	8.03	1889	0.00	1875
Silver Falls	0.85	6	0.05	- 0.80	1.28	1891	0.05	1894
Utah.								
Terrace	0.61	22	0.85	+ 0.24	2.15	1875	0.00	*
Vermont.								
Stratford	3.58	20	3.45	- 0.13	6.10	1891	1.70	1878
Virginia.								
Dale Enterprise	2.89	14	1.16	- 1.73	5.96	1886	0.57	1890
Washington.								
Fort Townsend	2.63	19	4.53	+ 1.90	4.65	1890	1.00	1875
West Virginia.								
Paikersburg	3.54	8	1.33	- 2.21	6.75	1885	1.33	1894
Wisconsin.								
Madison	1.88	23	0.92	- 0.96	3.65	1874	0.40	1878
Wyoming.								
Fort Washakie	0.58	11	0.09	- 0.47	1.43	1891	0.04	1886

*Frequently.

ACCUMULATED PRECIPITATION.

From the beginning to the end of January, 1894, the total precipitation was in excess of the normal over the middle and northern plateau and the middle and north Pacific regions; it was especially deficient over the upper Lakes, the Dakotas, the upper Mississippi Valley, the middle slope, and southern plateau region. In detail the precipitation since the beginning of the current year, as compared with the normal for this period, furnishes the following excesses in inches: Northern plateau, 2.20; north Pacific coast, 2.00; middle Pacific coast, 1.20; Abilene, Tex., 0.30; Missouri Valley, 0.20; middle plateau, 0.10; northern slope, 0.00. It also presents the following deficits: East Gulf States, 1.60; south Atlantic States, 1.40; Ohio Valley and Tennessee, 1.40; west Gulf States, 1.30; middle Atlantic States, 1.20; south Pacific coast, 0.90; Key West, Fla., 0.90; New England, 0.80; lower Lake region, 0.50; middle slope, 0.40; southern plateau, 0.40; upper Mississippi Valley, 0.30; upper Lake region, 0.20; North Dakota, 0.10. The corresponding percentages for January are the same as above given.

YEARS OF GREATEST PRECIPITATION FOR JANUARY.

The precipitation was the greatest on record at Walla

Walla, Wash., being 4.99, or 2.8 above the normal; the largest previous record was 3.45 in January, 1886.

YEARS OF LEAST PRECIPITATION FOR JANUARY.

The precipitation was the least on record at Detroit, Mich., being 0.94, or 1.1 below the normal; the lowest previous record for January was 0.97 in 1876. The rainfall at Yuma, Ariz., was 0.00, or 0.4 below the normal.

EXCESSIVE PRECIPITATION.

The following tables for January, 1894, show, by states, the number of stations reporting total precipitation to equal or exceed 10.00 inches during this month; 2.50 in 24 hours, and 1.00 in 1 hour:

Monthly precipitation to equal or exceed 10.00.

State.	Number of stations.	State.	Number of stations.
California	43	Washington	
Oregon	33		

Daily precipitation to equal or exceed 2.50 in 24 hours.

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
California	43	1, 13-14, 13-15, 13-16, 14, 14-15, 15, 15-16, 16, 19, 19-20, 20.	Florida	4	28-29.
Missouri	12	18-19, 19, 19-20, 20.	Massachusetts ..	4	27, 29-30.
Mississippi	8	5, 5-6, 7, 14, 14-15, 18, 20-21.	Indian Territory.	3	19, 19-20, 20.
Oregon	7	1, 12-13, 13-14, 14, 19, 21.	Louisiana	3	13-14, 14.
			Oklahoma	3	19.
			Washington	3	9, 11-13, 12-13.
			Alabama	1	6.

Hourly precipitation to equal or exceed 1.00.

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Florida	1	25.	Texas	1	20.
Indian Territory ..	1	20.			

Excessive precipitation, January, 1894.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.	Inches.	Inches.		Inches.	h. m.	
Birmingham	2.63	6				
Arkansas.						
Fayetteville	3.06	19-20				
Rogers	2.70	19-20				
California.						
Arcata	12.35	2.70	14			
Berkeley	3.70	14-15				
Boulder Creek	14.92					
Calistoga	15.28					
Cape Mendocino Lighthouse ..	19.31					
Cloverdale	13.72	6.92	14-15			
Do		3.74	20			
Colfax	13.43					
Crescent City	16.40	5.78	13-14			
Crescent City Lighthouse	16.39					
Delta	14.30					
Drytown	2.58	15				
Dunsmuir	17.53					
Edmonton	17.46	7.68	14-15			
El Verano	11.86					
Emigrant Gap	10.10					
Eureka	12.38	3.72	13-14			
Felton	11.30					
Fort Ross	18.66					
French Corral	2.70	16				
Georgetown	13.89	6.90	15-16			
Glen Ellen	18.67					
Grass Valley	11.24	5.28	15			
Girdley	3.87	14-15				
Healdsburg	11.21	5.40	15			
Humboldt Lighthouse	11.84					
Hydesville	13.57	4.42	13-14			
Do		2.58	20			
Iowa Hill	11.07	3.05	14-15			
Jackson	3.28	15				
Do	2.81	20				
Kelseyville	12.56	4.30	14			
Do	3.04	20				
Kennedy Gold Mine	3.75	14-15				
Lagrange	2.90	16				

Excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.	
		Amt.	Day.	Amt.	Time, Day.
California—Continued.					
Laurel	10.80				
Lick Observatory		2.97	15		
Do		3.48	20		
Los Gatos b.		3.32	15		
Mariposa		3.15	15		
Middletown	14.37	8.62	13-16		
Mills College	10.30	3.59	15		
Do		3.99	19-20		
Milton (near)		2.95	14-15		
Mokelumne Hill		3.40	14-15		
Mount Glenwood		6.04	14-15		
Nevada City	11.71	4.96	15		
Petaluma		2.98	20		
Placerville a.	11.55				
Placerville b.	11.05	4.24	15		
Point Arena	10.39				
Point Reyes (W. B.)	10.00	3.10	19-20		
Redding b.		3.75	14		
San Francisco		2.61	19-20		
San Rafael	10.79	3.84	15		
Do		3.84	20		
Shasta Springs	19.39	5.19	14		
Do		3.05	19-20		
Sims	10.98				
Sisson	10.72				
Sonoma	10.39	2.98	15		
Do		4.75	20		
Susanville		3.15	14-15		
Towles	13.76				
Trinidad Lighthouse	10.48				
Ukiah	15.68	5.30	14		
Do		4.20	20		
Upper Mattole	27.56	2.90	1		
Do		12.14	13-15		
Do		5.67	19		
Vacaville a.		4.24	14		
Vacaville b.	10.77				
Weaverville	11.47	5.07	14		
Wheatland		2.54	15		
Wire Bridge		2.76	15		
Yreka		4.29	14		
Florida.					
Federal Point		2.75	28-29		
Jupiter				1.05	1 00
Saint Francis Barracks		2.60	28-29		25
Tarpon Springs		2.49	28-29		
Titusville		4.14	28-29		
Indian Territory.					
Eufaula		3.00	19-20		
Lehigh		3.20	20	3.20	3 00
Purcell		3.14	19		20
Louisiana.					
Davis		2.75	14		
Natchitoches		3.15	13-14		
Winnfield		4.00	14		
Massachusetts.					
East Templeton		3.37	29-30		
Hyannis		2.86	27		
Kendall Green		2.68	29-30		
Woods Holl		2.56	27		
Mississippi.					
Crystal Springs		2.85	5		
French Camps		3.30	20-21		
Lake		2.80	7		
Okolona		2.77	14-15		
Palo Alto		2.71	18		
Thornton		3.04	14		
Topton		3.50	5-6		
Yazoo City		2.74	14-15		
Missouri.					
Arthur		2.82	19		
East Lynne		2.94	19-20		
Eight Mile		2.95	19-20		
Emma		2.75	20		
Harrisonville		2.53	19-20		
Hustain		2.62	18-19		
Marshall		2.51	20		
Neosho		3.25	19-20		
Stellada		2.96	19-20		
Virgil City		2.50	19-20		
Warrensburg		2.72	19-20		
Wheatland		2.83	19-20		
Oklahoma Territory.					
Burnett		3.37	19		
Clifton		2.52	19		
Oklahoma		3.21	19		
Oregon.					
Albany a.	12.15				
Albany b.	10.79				
Astoria	15.54				
Aurora	12.42				
Bandon	23.07	2.71	1		
Do		6.88	13-14		
Brownsville	10.93				
Canyon City		2.70	21		
Comstock	11.81				
Cornelius	14.46	2.45	19		
Corvallis a.	12.38				
Corvallis b.	11.41				
Corvallis (near).	15.44				

Excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
<i>Oregon—Continued.</i>						
Gardiner	21.33					
Glenora	24.65	7.76	12-13			
Grants Pass a.		2.51	14			
Hood River (near)	11.72					
Hubbard	10.11					
Lafayette	12.58					
Langlois	26.78	3.15	1			
Do		7.00	13-14			
McMinnville a.	13.68					
McMinnville b.	13.10					
Merlin	11.11					
Mount Angel	11.55					
Newport	16.15					
Oregon City	16.47					
Portland (V. O.)	12.60					
Riddles	19.34					
Salem a.	10.41					
Salem b.	11.09					
Sheridan	12.35					
Silverton	12.55					
Springbrook	12.82					
Toledo	21.69					
West Fork	13.91					
Williams	11.10	3.61	14			
<i>Texas.</i>						
Fredericksburg				1.95	1 30	20
<i>Washington.</i>						
Aberdeen	17.17					
East Clallam	17.95	5.68	11-13			
Elbe	13.37					
Fort Canby	11.02					
Lapush	13.22					
Nash Bay	18.50	2.80	9			
Olympia	10.14	2.50	12-13			
Pysh	13.59					
Silver Creek	10.52					
Tatoosh Island	16.39					
Union City	13.45					

MAXIMUM RAINFALL IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfall during January, 1894, for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering rain gauges. This record refers strictly to rainfall; the frequent interruptions of the self-registers, due to snow, explain the numerous cases of incomplete record.

Maximum rainfall in one hour or less.

Station.	Maximum rainfall in—					
	5 min.		10 min.		1 hour.	
	Inch.	Date.	Inch.	Date.	Inch.	Date.
Atlanta, Ga. *	0.09	24	0.14	10	0.39	10
Boston, Mass.	0.02	24, 29	0.03	27	0.14	27
Cincinnati, Ohio	0.05	5	0.07	5	0.18	5
Cleveland, Ohio *	0.06	4	0.11	4	0.31	4
Detroit, Mich. *	0.01	5	0.02	5	0.07	5
Eastport, Me. *	0.02	25	0.04	25	0.08	25
Galveston, Tex.	0.10	9, 24	0.19	24	0.43	24
Indianapolis, Ind.	0.03	20	0.05	20	0.13	4
Jacksonville, Fla.	0.05	28	0.10	28	0.28	28
Jupiter, Fla. *	0.40	25	0.60	25	1.05	25
Key West, Fla.	0.24	29	0.27	29	0.33	29
Memphis, Tenn.	0.25	4	0.45	4	0.90	4
Nantucket, Mass. *	0.03	27	0.04	27	0.22	27
Nashville, Tenn.	0.21	5	0.31	5	0.68	5
New Orleans, La.	0.23	20	0.35	20	0.42	15, 20
Norfolk, Va. *	0.07	26	0.10	26	0.29	26
Olympia, Wash.	0.04	13, 15	0.08	13	0.38	13
Philadelphia, Pa.	0.08	24	0.15	24	0.20	29
Portland, Oreg.	0.03	19	0.06	19	0.36	4
Rochester, N. Y.	0.02	15	0.03	15	0.10	15
St. Louis, Mo.	0.05	20	0.07	20	0.30	20
San Diego, Cal.	0.04	3	0.05	3	0.10	2-3
San Francisco, Cal.	0.15	26	0.17	20	0.36	20
Savannah, Ga.	0.01	1	0.02	1	0.07	1
Vicksburg, Miss.	0.16	14	0.26	14	0.78	14
Washington, D. C.	0.06	29	0.08	29	0.22	29
Wilmington, N. C. *	0.08	11	0.16	11	0.39	11

*Record incomplete.

FREQUENCY OF HEAVY PRECIPITATION DURING 24 YEARS.

The following tables show the number of years for which monthly precipitations of 10.00 inches, daily precipitations of

2.50 inches, and hourly precipitations of 1.00 inch have been reported for January during the last 24 years:

Frequency of excessive monthly precipitation.

State.	No. years noted.	State.	No. years noted.
California	17	Ohio	1
Washington	15	South Carolina	1
Oregon	14	Arizona	0
Louisiana	8	Colorado	0
Georgia	8	The Dakotas	0
North Carolina	8	Delaware	0
New York	7	District of Columbia	0
Tennessee	7	Idaho	0
Alabama	7	Indian Territory	0
Texas	6	Iowa	0
Mississippi	6	Maine	0
Arkansas	4	Maryland	0
Indiana	4	Michigan	0
Massachusetts	3	Minnesota	0
Florida	3	Montana	0
Illinois	2	Nebraska	0
New Jersey	2	New Mexico	0
Virginia	2	Pennsylvania	0
Connecticut	1	Rhode Island	0
Kansas	1	Utah	0
Kentucky	1	Vermont	0
Missouri	1	West Virginia	0
Nevada	1	Wisconsin	0
New Hampshire	1	Wyoming	0

Frequency of excessive daily precipitation.

Louisiana	16	Connecticut	3
Tennessee	14	Iowa	3
North Carolina	13	Arizona	3
Texas	12	Maine	2
Georgia	12	Maryland	2
Florida	11	Nevada	2
Oregon	10	New Hampshire	2
California	10	Utah	2
Mississippi	10	Delaware	1
Alabama	9	Idaho	1
Washington	8	Michigan	1
Virginia	7	Nebraska	1
Massachusetts	7	Vermont	1
New York	6	Colorado	0
South Carolina	6	District of Columbia	0
Arkansas	6	The Dakotas	0
Illinois	5	Kansas	0
Indiana	5	Minnesota	0
Ohio	5	Montana	0
Pennsylvania	5	New Mexico	0
Kentucky	4	Rhode Island	0
New Jersey	4	West Virginia	0
Missouri	4	Wisconsin	0
Indian Territory	4	Wyoming	0

Frequency of excessive hourly precipitation.

Texas	4	Michigan	0
Florida	2	Massachusetts	0
Illinois	2	Minnesota	0
Alabama	1	Mississippi	0
California	1	Missouri	0
Georgia	1	Montana	0
North Carolina	1	Nebraska	0
Tennessee	1	Nevada	0
Arkansas	0	New Hampshire	0
Arizona	0	New Jersey	0
Colorado	0	New Mexico	0
Connecticut	0	New York	0
The Dakotas	0	Ohio	0
Delaware	0	Oregon	0
District of Columbia	0	Pennsylvania	0
Idaho	0	Rhode Island	0
Indiana	0	South Carolina	0
Indian Territory	1	Utah	0
Iowa	0	Vermont	0
Kansas	0	Virginia	0
Kentucky	0	Washington	0
Louisiana	0	West Virginia	0
Maine	0	Wisconsin	0
Maryland	0	Wyoming	0

EXCEPTIONAL PRECIPITATION DURING 24 YEARS.

The following tables give exceptionally heavy monthly, daily, and hourly precipitation reported for January during the last 24 years:

Exceptional monthly precipitation.

Station and state.	Am't.	Year.	Station and state.	Am't.	Year.
Upper Mattole, Cal	Inches.		Emigrant Gap, Cal	Inches.	
Do	41.63	1888	Glenora, Oreg	25.69	1881
Neah Bay, Wash.	33.40	1889	Randon, Oreg	24.65	1894
Upper Mattole, Cal	30.50	1874	Bedding, Cal	23.07	1894
Langlois, Oreg	27.56	1894	Neah Bay, Wash.	22.69	1878
	26.78	1894		22.30	1887

Exceptional monthly precipitation—Continued.

Station and state.	Am't.	Year.	Station and state.	Am't.	Year.
	Inches.			Inches.	
Ferndale, Cal	22.17	1889	Red Bluff, Cal.	20.71	1878
Astoria, Oreg	22.16	1871	Calistoga, Cal	20.64	1878
Gardiner, Oreg	21.33	1894	Tatoosh L. H., Wash	20.50	1871
Iowa Hill, Cal	20.77	1889	Alta, Cal	20.00	1881
Cisco, Cal	20.86	1881			

Exceptional daily precipitation.

Station and state.	Amount.	Date.	Station and state.	Amount.	Date.
	Inches.			Inches.	
Upper Mattole, Cal	31.68	27-31, 1888	Jackson Barracks, La.	5.72	11-12, 1892
Do	12.14	13-15, 1894	Shreveport, La.	5.71	13, 1885
Bay St. Louis, Miss	11.10	10-14, 1892	Fostoria, Tenn.	5.70	14-15, 1885
Montgomery, Ala	9.98	12-13, 1892	East Clallam, Wash	5.68	11-13, 1894
Canton, Ga	8.95	10-13, 1892	Upper Mattole, Cal	5.67	19, 1894
Hydesville, Cal	8.86	28-31, 1888	Daphne, Ala	5.62	11-12, 1892
Middletown, Cal	8.62	13-16, 1894	Resaca, Ga	5.61	12-13, 1892
Brewton, Ala	8.55	12-13, 1892	Clintonville, Ala	5.50	23-24, 1885
Point Pleasant, La	8.40	1-2, 1886	Julian, Cal	5.50	28-29, 1892
Fort Ross, Cal	8.20	1-2, 1892	Dale Enterprise, Va.	5.49	8-9, 1886
Glenora, Oreg	7.76	12-13, 1894	Duarte, Cal	5.47	30, 1893
Edmonton, Cal	7.68	14-15, 1894	Mahanoy Plane, Pa	5.45	4-5, 1886
Wiggins, Ala	7.47	11-13, 1892	Fort Barrancas, Fla	5.42	12-13, 1892
Langlois, Oreg	7.06	13-14, 1894	Healdsburg, Cal	5.40	15, 1894
Emory Grove, Md.	7.00	30, 1879	Cheneyville, La	5.40	29, 1891
Cloverdale, Cal	6.92	14-15, 1894	Pasadena, Cal	5.34	30-31, 1893
Georgetown, Cal	6.90	15-16, 1894	Ukiah, Cal	5.30	14, 1894
Bandon, Oreg	6.88	13-14, 1894	Grass Valley, Cal	5.28	15, 1894
Portland, Oreg	6.86	5-6, 1893	Pana, Ill	5.25	
Rome, Ga	6.83	11-13, 1892	Marietta, Ga	5.22	12-14, 1892
Greensboro, Ala	6.77	2-3, 1886	Fulton, Ark	5.20	1, 1890
Glendora, Cal	6.75	30, 1893	Shasta Springs, Cal	5.19	14, 1894
Clarksville, Tex	6.52	—, 1875	Cairo, Ill	5.17	17-18, 1876
Marion, Ala	6.50	2-3, 1886	Talladega Falls, Ala.	5.10	12-13, 1892
Huntsville, Tex	6.45	2, 1890	Kenton, Ohio	5.10	27-28, 1876
Jupiter, Fla	6.38	11-12, 1889	Forestville, Cal	5.08	1, 1892
Neah Bay, Wash	6.15	6-7, 1885	Weaverville, Cal	5.07	14, 1894
Diamond, Ga	6.07	12-13, 1892	Tuscaloosa, Ala.	5.00	2-3, 1886
Mount Glenwood, Cal	6.04	14-15, 1894	Delhi, La	5.00	22-23, 1887
Fayette, Miss	6.00	6, 1883	Point Pleasant, La.	5.00	7-8, 1886
Fayetteville, N. C.	6.00	8-9, 1879	Jeanerette, La	5.00	8, 1891
Houston, Tex	5.89	7-8, 1891	Lake Charles, La	5.00	8, 1891
Crescent City, Cal	5.78	13-14, 1894	Mount Willing, Ala	5.00	12, 1892
Oxanna, Ala	5.74	11-12, 1892			

Exceptional precipitation for one hour or less.

Station and state.	Amount.	Time.	Date.
	Inches.	h. m.	
Jupiter, Fla	0.40	0 05	25, 1894
Memphis, Tenn	0.25	0 05	4, 1894
Galveston, Tex	0.25	0 05	15, 1890
Key West, Fla	0.25	0 05	22, 1891
Jupiter, Fla	0.60	0 10	25, 1894
Atwood, Ill	4.36	1 00	12, 1890

MONTHLY SNOWFALL.

The depth of snow that fell during the month of January, 1894, as reported by both regular and voluntary observers, is shown by the lines and figures on Chart V, which also gives, by the full line, the limit at which minimum temperatures of 32° F. were at any time reported at the regular Weather Bureau stations; by the dotted line is given a similar limit for 40°. These air temperatures within Weather Bureau shelters are, of course, higher than would be given by thermometers exposed in the open air. The line of 40° within a shelter usually marks the limit of frosts on the open surface of the ground. The date of the first snow is given in the table of dates of first frost on p. 11.

DEPTH OF SNOW ON GROUND.

The depth of unmelted snow lying on the ground at 8 p. m. Monday of each week during the winter season is shown by a series of weekly maps published by the Weather Bureau, beginning with Monday, January 1, 1894, based upon telegraphic reports received from a comparatively few selected stations. These maps may be summarized as follows:

January 1, the maximum depth was 35 inches near Marquette, Mich.; the southern limit passed from central Utah

northward to central Washington and eastward to Long Island Sound.

January 8, maximum depths, 45 inches near Marquette, Mich.; 20 near Baker City, Oreg.; southern limit from central Utah to northern Massachusetts.

January 15, maximum depth, 30 inches near Marquette and Sault Ste. Marie, Mich.; southern limit from northern Wyoming eastward to northern Massachusetts.

January 22, maximum depth, 20 inches near Marquette, Mich.; southern limit from central Colorado to Lake Superior and in southern Vermont and New Hampshire.

January 29, maximum depth, 25 inches near Marquette, Mich.; southern limit from southern Oregon east to South Dakota, southeast to southern Missouri, thence northeast to New Jersey.

The accompanying chart, No. VI, gives the depth, in inches, of snow lying on the ground on January 31 at several hundred stations, selected from among many hundred that report the presence of more or less snow. The irregularities of local distribution are so great that it seems hardly practicable to draw lines of equal snow depth, and yet an attempt has been made to indicate the zone where a trace of snow is still left on the ground. The line of 5-inch depth has also been drawn through regions where reports are sufficiently numerous to indicate that the general average depth is not less than that amount. The maximum depths on the ground at the end of the month are: California, Edmanton, 41. Colorado, Climax, 60. Idaho, Garden Valley, 34. Maine, Easton, 44. Massachusetts, Munroe, 20. Michigan, Calumet, 45; Marquette, 30. Minnesota, North Branch, 20. Nevada, Edgewood, 30. New Hampshire, West Milan, 35. New York, Leroy, 25. Oregon, Sparta, 26. Utah, Silver Lake, 74. Vermont, Strafford, 24. West Virginia, Pleasant Hill, 24. Wisconsin, Crandon, 36.

The accompanying table shows both the total snowfall and the depth of snow on the ground on the 15th and 31st of the month:

Snowfall of 10 inches or more, January, 1894, with amounts on ground on the 15th and at the close of the month.

State and station.	Total.	15th.	31st.	State and station.	Total.	15th.	31st.
Arizona.	<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>	Colorado—Cont'd.	<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>
Chiricahua Mountains	16.0			Pagoda (near)	18.5	6.0	12.0
Flagstaff	20.0			Red Cliff	37.5		
Payson	11.5	0.0	0.0	Rico	17.3		
California.				Wara District	15.0		
Boca	46.0			Connecticut.			
Cisco	164.5			Bridgeport	14.8	0.0	7.4
Cloverdale	17.0			Canton	15.5	0.0	14.0
Deep Creek	11.2			Colchester	12.5	1.0	6.0
Delta	25.0			Falls Village	17.0	0.0	12.0
Dunsmuir	44.5			Greenfield Hill	19.0	T.	11.0
Edmanton	81.0	26.0	41.0	Hartford b	11.0	0.0	7.0
Emigrant Gap	101.0			Lebanon	17.0	0.0	10.0
Girard	16.0			Middletown	14.0	T.	8.0
Gormans Station	20.5			New Hartford a	17.7	1.0	12.0
Green Valley a	11.2			New Hartford b	12.5		
Jackson	14.0			New Haven	16.0	0.0	6.5
Keene	12.0			New London	18.1	0.0	6.0
Lick Observatory	10.5			North Grosvenor Dale	15.0		14.0
Little Bear Valley	15.2			Norwalk	11.8		4.2
Little Bear Valley (near)	16.8			Southington	12.0		
Lower Holcomb Valley	10.0			South Manchester	11.0	0.0	8.0
Morse House	19.0			Storrs	10.2	0.0	5.5
Nevada City	16.0			Wallingford	11.0	T.	9.0
Redding a	14.0			Waterbury	17.0	0.0	12.0
Redding b	13.0			West Simsbury	14.0	2.0	8.0
Shasta Springs	61.7			Idaho.			
Sims	32.0			American Falls	19.0		
Sisson	32.0			Atlanta Hill		72.0	84.0
Squirrel Inn	15.0			Chesterfield	16.0	8.0	14.0
Susanville	27.5			Elgin	16.0	6.0	12.8
Tehachapi a	14.0			Garden Valley	41.0	20.0	31.0
Tehachapi b	10.0			Grangeville	43.4	2.0	10.0
Towles	31.0			Idaho Falls	17.8	T.	4.0
Truckee	77.0			Kootenai	18.0		
Tunnel No. 2	10.4			Lake	35.0		
Weaverville	42.5		6.0	Murray	83.0		
Colorado.				Paris		8.0	10.0
Breckenridge	26.6	42.0	42.0	Payette	10.2	0.0	0.0
Climax	48.3	78.0	60.0	Safubria	38.8	9.2	10.0
Glenwood Springs	18.0	3.5	3.0	Illinois.			
Gold Hill	3.8	10.0	10.0	Dixon	10.5		
Lay	11.2	6.0	8.0	Rockford	10.5		
McCoy	9.5	10.0	14.0	Indiana.			
Meeker	18.5	8.0	6.0	Hammond	10.0	0.0	

Snowfall of 10 inches or more—Continued.

State and station.	Total.	15th.	31st.	State and station.	Total.	15th.	31st.
Iowa.	<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>	Michigan—Cont'd.	<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>
Hawkeye	12.0	0.0	3.0	Grayling	13.5		
Iowa City	11.0	0.0	6.0	Harbor Springs	34.0	20.0	16.0
Mechanicsville	12.0		5.0	Harrison	13.0	0.0	6.0
Maine.				Harrisville	10.6		
Bar Harbor	25.5	3.0	19.0	Lake City	17.0	4.0	10.0
Belfast	24.0	33.0	30.0	Lathrop	8.0	20.0	22.0
Calais	25.0	30.0	37.0	Lewiston		12.0	8.0
Cornish	13.0			Lodi	13.4	1.5	1.0
East Machias	22.0	12.0	18.0	Marquette	22.9	30.2	30.5
Easton	23.0	36.0	44.0	Mayville	14.5	0.0	7.0
Eastport	13.6	5.0	5.7	Mio		18.0	12.0
Fairfield	21.0	20.0	26.0	Paris	12.0		9.0
Farmington	16.0	17.0	(7)	Saint Ignace	24.5	11.0	12.0
Gardiner	25.0	20.0	20.0	Sault Ste. Marie	22.4	30.1	18.1
Houlton	22.0	34.0	36.0	Vandalia	12.5	0.0	7.0
Indian Stream	26.0	24.0	37.0	Williamston	13.0	0.0	4.0
Kents Hill	8.0	20.0	20.0	Minnesota.			
Lewiston	18.2			Caledonia	10.7	T.	5.0
Madison	28.5	26.0	38.0	Cambridge	10.5	15.0	13.0
Mattawamkeag	18.0			Dawson	12.1	8.5	12.8
North Bridgeton	11.0	20.0		Farmington	12.2	12.0	14.0
Orono	23.5			Fort Ripley	10.0		
Maryland.				Hastings	12.5	9.0	13.0
Oakland	21.5		10.0	Lake Winnibigoshish	13.3		
Sunnyside	17.5		12.0	Leech Lake	14.1	15.0	15.0
Massachusetts.				Maple Plain	15.9	16.0	18.0
Adams		2.0	12.0	Marfield	17.1	16.0	19.0
Amherst	19.5			Mazepa	12.0	6.0	8.0
Amherst Ex. Station a	20.2	T.	13.0	Medford	10.0	2.0	8.0
Amherst Ex. Station b	19.5		13.0	Minneapolis (W. B.)	12.0	10.0	6.0
Andover	20.0			Minneapolis a	13.7	20.0	13.0
Bedford	19.0		15.0	Minneapolis b	14.3	9.0	10.5
Beverly Farms	19.0	4.0	14.0	North Branch	17.7	28.0	20.0
Blue Hill (summit)	17.8	T.	12.0	Pokegama Falls	12.8	13.0	18.0
Boston (W. H.)	13.6	5.0	5.7	Rolling Green	16.5	2.0	15.0
Boston (V. O.)	16.5			Sandy Lake Dam	12.4	11.0	7.0
Brockton a	12.8	6.0	6.0	Warren	11.9	4.0	9.0
Brockton b	12.0	0.0	6.0	Missouri.			
Chestnut Hill	16.0	1.0	12.0	New Haven	10.0		3.0
Clinton			14.0	Montana.			
Concord	19.4	1.0	14.0	Choteau	12.0	0.0	7.0
Dudley	12.5	T.	9.0	Cokedale	22.0		
East Templeton	22.2	1.0	16.5	Fort Logan	19.0		8.0
Fall River	20.5		15.0	Fort Missoula	15.6		
Fiskdale	20.0		10.0	Great Falls	13.6	0.0	4.8
Fitchburg a	17.5	0.0	15.5	Helena	15.0	T.	4.6
Fitchburg b	18.3	(?)	15.0	Hogan	18.1		
Framingham	9.5	0.0	12.0	Martinsdale	23.5	4.0	5.0
Gilbertville	30.0	3.0	16.0	Mingusville	11.4		
Groton a	23.5	T.	15.0	Musselshell	17.0		6.0
Hingham	16.0			Nebraska.			
Hyannis	13.5	0.0	1.0	Bassett	17.5	6.0	10.0
Kendall Green	12.0			Burwell	10.0	0.0	0.0
Lawrence	18.2	2.5	12.0	Kimball	11.0		
Leeds	17.2	5.0	14.0	Lexington	13.0		
Leominster	18.5	0.0	13.0	Mullen	13.0		
Long Plain			15.0	Valentine	10.9	0.0	3.6
Ludlow Center	17.8	0.5	3.0	Nevada.			
Mansfield	17.5	T.	12.0	Austin	12.1	2.0	0.0
Middleboro	18.0	0.0	6.0	Belmont	11.5	6.0	8.0
Milton	16.0			Carlin	19.3		
Monroe	25.5	6.0	20.0	Edgewood	58.0	28.0	30.0
Monson	21.5	1.0	12.0	Elko	11.0		
Mount Nonotuck	22.5	2.0	15.0	Empire Ranch	10.8	3.0	4.0
New Bedford a	22.0		6.0	Genoa	29.0		
New Bedford b	14.0	0.0	10.0	Gold Hill	19.5	12.0	0.0
North Billerica	18.0	1.0	12.0	Halleck	15.0		
Plymouth	22.0			Lewes Ranch	20.9	3.0	3.0
Provincetown	10.0	0.0	4.0	Palisade	22.0		
Randolph	20.0	T.	12.0	Palmetto	11.0	4.0	10.0
Roberts Dam	12.0			South Camp	29.2	9.0	5.5
Roxbury	17.4	T.	9.0	Stoffel	30.5	4.0	14.0
Royalston	16.0	1.5	7.0	Virginia City	40.5	22.0	8.0
Salem	19.5			New Hampshire.			
Salisbury	14.8	4.0	6.0	Alstead	14.6	6.5	9.0
Somers t	20.0	T.	16.0	Antrim	17.0		14.0
Springfield Armory	16.2			Berlin Mills	25.2	15.0	21.0
Taunton a	16.0	0.0	8.0	Bethlehem	20.5	9.0	13.0
Taunton b	14.5	0.0	8.0	Brookline	24.0	5.0	18.0
Wakefield	18.0	2.0	13.0	Concord	16.0	12.0	12.0
Webster	18.2	2.2	13.0	Dublin	21.0	T.	12.0
Wellesley	11.0		10.0	East Canterbury	16.5	13.0	19.0
Westboro	21.5	0.0	12.0	Grafton	15.5	10.0	14.0
Winchendon	16.5	6.0	14.0	Hanover a	13.1	6.5	8.0
Winthrop	19.8	1.0	10.0	Keene	14.2	4.0	10.0
Woods Holl	19.0	0.0	1.9	Lancaster	17.5	14.0	17.0
Worcester a		10.0		Littleton	23.0	18.0	24.0
Worcester b	17.0	17.0	8.0	Nashua	15.5		17.0
Michigan.				Newton	16.0	5.0	12.0
Allegan	10.0	0.0	6.0	North Conway	12.0	15.0	15.0
Alma	10.5	3.0	6.0	Peterboro	18.0	3.0	15.0
Alpena	10.4	1.0	6.3	Plymouth	12.8	16.0	20.0
Arbela	13.0		7.0	Sanbornton	11.8	16.0	19.0
Bear Lake	19.0	2.0	4.0	Stratford	23.0	12.0	14.0
Hellaire	22.4			West Milan	22.5	30.0	35.0
Benton Harbor	12.4	0.0	6.0	New Jersey.			
Benzonia	19.8	8.0	7.0	Bayonne	10.0	T.	2.0
Boon	19.0	12.0	10.0	Boonton	10.5	0.5	5.0
Brown City	11.0	0.0	4.0	Chester	13.0	0.0	2.0
Calumet	37.0	31.0	45.0	Dover	14.0	0.0	6.0
Charlevoix	17.0			Franklin Furnace	16.5	0.0	7.0
Cheboygan	27.0	20.0	24.0	Newton	16.0		12.0
Crystal Falls	5.0		26.0	Paterson	12.0		1.0
Escanaba	12.0			River Vale	11.0		
Flint	10.6	0.0	5.0	Tenafly	13.5	2.0	5.0
Gaylord	32.5	20.0	12.0	New Mexico.			
Grand Haven	11.3	0.0	4.0	Chama	16.0	12.0	12.0
Grand Rapids	12.2	0.0		Monero	11.0	8.0	4.0

Snowfall of 10 inches or more—Continued.

State and station.	Total.	15th.	31st.	State and station.	Total.	15th.	31st.
New York.				South Dakota—Cont'd.			
Albany.....	14.9	1.3	7.0	Rosebud.....	15.0	2.0	6.0
Alfred Center.....	15.0	0.0	11.0	Sioux Falls.....	10.8	10.0	13.0
Angelica.....	20.0	0.0	13.0	Spearfish.....	15.0	0.0	5.0
Arcade.....	16.7	0.0	13.0	Tyndall.....	11.0		
Baldwinsville.....	19.0	0.0	6.0	Watertown.....	12.3	3.0	5.0
Brentwood.....	14.1			Webster.....	12.5		
Brookfield.....	27.0	2.0	12.0	Wessington Springs.....	13.8	8.0	15.0
Buffalo.....	11.9	0.0	7.4				
Canastota.....	12.0	T.	8.0	Utah.			
Cooperstown.....	21.0	0.0	10.0	Castle Gate.....	10.2	1.5	0.0
Factoryville.....	10.5			Corinne.....	11.5		
Friendship.....	16.6	0.0	12.4	Grouse Creek.....	28.7	4.0	8.0
Glen Falls.....	15.0			Heber.....	36.5	12.0	21.0
Gloversville.....	17.2	5.0	9.0	Levan.....	17.0	8.5	13.0
Honeymead Brook.....	15.0	0.0	10.0	Logan.....	18.5		
Humphrey.....	22.8	0.0	14.0	Manti.....	12.0		
Ithaca.....	12.3	0.0	8.5	Ogden.....	27.8		
Lebanon Springs.....	17.1	3.0	8.0	Ogden.....	15.2	8.0	6.0
Le Roy.....	34.5	0.0	25.0	Parowan.....	17.5		
Lockport.....	11.0	0.0	8.0	Provo City.....	23.5		
Lyonville.....	23.0	4.0	16.0	Salt Lake City.....	14.5	1.0	0.8
Madison Barracks.....	17.5			Silver Lake.....	66.0	60.0	74.0
Malone.....	15.1	0.0	9.4	Snowville.....	19.0	2.0	5.0
Middletown.....	13.7			Thistle.....	16.0		
New Lisbon.....	12.0	1.0	6.0				
New York.....	10.2	0.0	0.7	Vermont.			
North Hammond.....	18.0	0.0	14.0	Brattleboro.....	21.2		
Number Four.....	21.5			Burlington.....	14.0	2.0	5.0
Ogdensburg.....	17.5	4.0	12.0	Cornwall.....	15.0	3.0	6.0
Oswego.....	18.8	1.0	9.0	Enosburg Falls.....	13.0	8.0	12.0
Palermo.....	15.5	T.	4.2	Hartland.....	16.6	11.0	13.0
Perry City.....	16.8	0.0	13.8	Irasburg.....	34.0		
Port Jervis.....	12.0	0.0	4.0	Jacksonville.....	22.6	2.0	13.0
Poughkeepsie.....	12.0	0.2	10.0	Northfield.....	24.9	9.0	22.6
Rochester.....	20.0	0.0	11.7	Norwich.....	16.0	8.0	12.0
Romulus.....	14.8	0.0	12.0	Stratford.....	27.0	15.0	24.0
Rondout.....	13.0			Vernon.....	18.5		12.0
Saranac Lake.....	21.5	4.0	10.0	Woodstock.....	22.0	7.0	12.0
Setauket.....	17.0	0.0	5.0				
South Canastota.....	14.1	0.0	5.0	Washington.			
Stillwater.....	25.0	2.0	10.0	Blaine.....	14.0		
Turin.....	38.1	6.0	14.0	Colfax.....	22.6	0.0	4.0
Varysburg.....	18.1	0.0	12.0	Dayton.....	31.5		
Wappinger Falls.....	15.5	2.0	10.0	Elbe.....	39.0	T.	2.0
Watertown.....	20.0	0.0	18.0	Ferry.....	11.0		0.0
Wedgwood.....	14.2	0.0	12.0	Fort Simcoe.....	13.0		12.0
				Fort Spokane.....	17.7	2.0	12.0
North Dakota.				Fort Townsend.....	11.5	0.0	0.0
Williston.....	10.9	2.5	7.0	Hunters.....	23.2	T.	17.5
Ohio.				Pine Hill.....	49.8	0.0	3.0
Ellsworth.....	10.5		1.0	Pomeroy.....	30.5		10.0
Wheeler.....	17.0			Pullman.....	24.8		6.0
Oregon.				Pysht.....	10.0		
Baker City.....	27.3	T.	1.6	Rosalie.....	12.8	0.0	3.0
Bandon.....	12.5			Silver Creek.....	25.0		
Beulah.....	19.0			Spokane.....	15.3	0.0	4.2
Canyon City.....	72.2	0.0	0.0	Union City.....	10.0		
Crook.....	20.5	0.5	0.5	Walla Walla.....	22.5	0.0	1.0
Glenora.....	21.8	0.0		Waterville.....	11.2	5.5	
Heppner.....	14.0						
Hood River (near).....	57.5	0.0	3.0	West Virginia.			
Joseph.....	43.0	0.0	14.0	Beverly.....	12.5	0.0	10.5
New Bridge.....	24.0	2.0	0.0	Buchanona.....	11.0		
Pendleton.....	20.2		4.0	Davis.....	20.0		
Riddles.....	24.0			Grafton.....	11.2	0.0	1.5
Siskiyou.....	86.0			Pleasant Hill.....	34.0		24.0
Sparta.....	66.0	33.0	26.0	Tannery.....	14.5	0.0	5.0
The Dalles.....	21.5	0.0	T.	Wisconsin.			
West Fork.....	13.5			Amherst.....	9.1	10.0	8.0
Weston.....	22.5			Baraboo.....	11.7	0.0	5.0
Williams.....	10.5			Barron.....	16.8	14.0	16.0
Pennsylvania.				Bayfield.....	15.0	38.0	32.0
Blooming Grove.....	15.0	0.0	9.0	Butternut.....	8.0	26.0	32.0
Blue Knob.....	15.5	0.0	13.0	Centralia.....	8.0	15.0	12.0
Clarion.....	16.0	0.0	12.0	Chilton.....	14.4		5.0
Confluence.....	12.0	0.0	11.0	Chippewa Falls.....	21.5		
Drifton.....	16.5	0.0	12.5	City Point.....	11.0	12.0	5.0
Dubois.....	13.2			Columbus.....	10.0		
Dyberry.....	11.0	T.	7.0	Crandon.....	19.0	30.0	36.0
Edinboro.....	10.0		12.0	Delevan.....	17.5	T.	2.0
Girardville.....	12.0		10.5	Estella.....	15.1	16.0	14.0
Grampian.....	14.0	0.0	10.0	Florence.....	17.5	15.0	20.0
Honesdale.....	11.0	0.0	8.0	Fond du Lac.....	12.0	0.0	5.0
Kane.....	23.0	0.0	13.0	Grantsburg.....	14.0	18.0	22.0
Le Roy.....	11.2	0.0	10.0	Green Bay.....	10.3	4.2	5.8
Pottstown.....	10.5		1.0	Hayward.....	14.5	30.0	34.0
Ridgway.....	12.8			Hillsboro.....	10.0	0.0	5.0
Salem Corners.....	11.6	1.0	6.0	Koepenick.....	9.0	23.0	20.0
Shinglehouse.....	17.7	0.0	14.0	La Crosse.....	10.7	0.1	4.0
Smethport.....	16.0			Meadow Valley.....	12.5	0.0	8.0
Somerset.....	15.0		6.0	Medford.....	20.5	16.0	15.0
Stoyestown.....	14.0			Menomonie.....	12.5	13.0	11.0
Warren.....	13.0	0.0	8.0	Neillsville.....	?	10.0	10.0
Wellsboro.....	10.5	0.0	10.5	New Holstein.....	13.4	0.0	2.0
Rhode Island.				Oconto.....	16.1	11.0	8.0
Bristol.....	23.0	0.0	6.0	Oscola.....	17.5	20.0	15.0
Kingston.....	24.5	0.0	14.0	Pepin.....	11.0	4.0	9.0
Lonsdale.....	19.8	0.0	13.0	Portage.....	11.5		
Pawtucket.....	20.2	0.0	12.0	Shawano.....	15.0	19.0	20.0
Providence.....	18.5	0.0	9.0	Stevens Point.....	10.5	10.0	9.0
South Dakota.				Valley Junction.....	12.0	4.0	5.0
Alexandria.....	12.0	8.0	18.0	Westfield.....	16.0	4.0	6.0
De Smet.....	11.0	3.0	14.0	Weston.....	16.2	12.0	4.0
Oelrichs.....	17.0	6.0	4.0	Wyoming.			
				Fort Yellowstone.....	16.4		
				Sundance.....	11.0		

HAIL.

Description of the more severe hailstorms of the month is given under "Local storms." Hail was reported as follows: 1st and 2d, California. 4th, California and Missouri. 11th, Arizona. 15th, Alabama and California. 16th, California and Oregon. 17th, California and Missouri. 18th, Arizona and Oregon. 19th, Texas. 20th, Mississippi and Missouri. 23d and 24th, Texas. 29th, South Carolina. 31st, California.

FOG AND DEW.

Mr. W. B. Knight, observer at Lake City, Columbia Co., Fla., reports precipitation 0.13 on the morning of the 7th and 0.09 on the morning of the 8th, and states that this was not rainfall proper, but an accumulation of dew and fog in his rain gauge; the fog was unusually heavy; the ground appeared as after a good shower, and the trees sparkled with the heaviest load of dew drops ever seen by the observer. The fog was heaviest on the 9th and 10th, but little or no dew appeared on the trees and none was caught in the gauge. The fog was also very heavy on the morning of the 17th, but only a trace was found in the gauge. This seems to illustrate the general principle that the quantity caught in the gauge must depend considerably upon the temperature of the gauge and its power of attracting and holding the foggy particles that float near it. If the ground or roof and the adjacent gauge are cooled by radiation under a clear sky, they gather dew, properly so-called, or if a flow of foggy air then comes over them they may condense its particles upon themselves. If, on the other hand, they are covered with the foggy atmosphere before they have cooled by radiation, while still retaining the warmth of the previous sunshine, then they will collect little or no dew.

On the 15th and 16th heavy fog prevailed in the lower Lake region, and the consequent leakage from telegraph wires greatly interrupted telegraphic communication.

SLEET.

Description of the more severe sleetstorms of the month is given under "Local storms." Sleet was reported as follows: 1st, Idaho and North Carolina. 2d, Idaho, Minnesota, and Nevada. 3d, Arizona, Iowa, Kansas, Massachusetts, Michigan, Nebraska, Oregon, Vermont, and Washington. 4th, Arizona, California, Illinois, Michigan, Missouri, Nevada, New York, North Dakota, and Oregon. 5th, Arizona, Maine, Missouri, Nebraska, New York, Oklahoma, Oregon, and South Carolina. 6th, Connecticut, Illinois, Indiana, Kentucky, Maine, Michigan, New York, Ohio, Oklahoma, Pennsylvania, and Washington. 7th and 8th, Oregon and Washington. 9th, North Carolina, Ohio, Oregon, and Virginia. 10th, Indian Territory, Minnesota, Pennsylvania, and Texas. 11th, Delaware, Kansas, Maine, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and West Virginia. 12th, New Jersey. 13th, Arizona and Kansas. 15th, Massachusetts, Minnesota, Montana, Nebraska, New York, North Dakota, and Washington. 16th, Colorado, Maine, Montana, New Hampshire, North Dakota, Oregon, Utah, and Washington. 17th, California, Minnesota, Nevada, New Hampshire, and Washington.

18th, California, Nevada, New Hampshire, Oregon, Vermont, and Washington. 19th, California, Colorado, Illinois, Iowa, Kansas, Massachusetts, Michigan, Missouri, Montana, Nevada, New Hampshire, Oregon, Washington, and Wisconsin. 20th, California, Michigan, Minnesota, Missouri, Nebraska, Washington, and West Virginia. 21st, Maine, New Hampshire, New York, Pennsylvania, and Virginia. 22d, Minnesota. 23d, Arkansas, Illinois, Indian Territory, Missouri, North Dakota, Oklahoma, and Texas. 24th, Alabama, Arkansas, District of Columbia, Indiana, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Missouri,

North Dakota, Ohio, Pennsylvania, Tennessee, Texas, and Vermont. 25th, Connecticut, Kentucky, Maine, Maryland, Massachusetts, New Jersey, North Carolina, and Pennsylvania. 26th, Connecticut, Maryland, Missouri, Nebraska, Nevada, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, and West Virginia. 27th, Connecticut, Louisiana, Maryland, New Jersey, and Rhode Island. 28th, Kansas, Nebraska, North Carolina, and Ohio. 29th, Connecticut, Idaho, Kentucky, Maryland, Massachusetts, Missouri, Nevada, New Jersey, New York, North Carolina, North Dakota, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. 30th, Connecticut, Georgia, Maine, Maryland, Massachusetts, Nevada, New Hampshire, New Jersey, New York, Pennsylvania, and Virginia. 31st, Arkansas, Illinois, Indiana, and South Carolina.

WET AND DRY PERIODS.

The Weather Crop Bulletin for the month of January shows that there was a slight excess of precipitation over the greater portion of the spring-wheat region and near Lake Superior; the month was considered dry throughout the southern and Atlantic coast States; the snow that covered the greater portion of the winter-wheat region on the 29th had by February 1 disappeared only in the southern portions of Indiana, Illinois, and Missouri, leaving the greater portion of the winter-wheat crop still covered.

The advantage of a snow covering consists in keeping the ground warm and in protecting plants, seeds, and roots from killing cold and frost; it also prevents the moisture already in the ground from evaporating, but does not add very much to it. A foot of snow is but an inch of rain and when the dry, warm winds blow, more snow evaporates into the air than melts into the ground.

The following notes have been generally extracted from the monthly reports of the State weather services, and refer principally to the relations between the precipitation and the crops:

Iowa.—College Springs, fall wheat has suffered slightly with drought.

Keokuk, from January 10-20 frost was entirely out of the ground and farmers engaged in plowing.

Minnesota.—The dry spells of weather were from the 17th-19th and 21st-27th; the number of rainy days averaged only six; the amount of snow on the ground on the 15th was about normal, and on the 31st was about 10 inches, which is 4 inches less than last year, but in excess of the years 1889 and 1892.

Nevada.—Cranes Ranch, the month was good for feeding stock, horses on the range doing well. Eureka, if more snow does not fall, a scarcity of water next summer is feared by the farmers. Sunnyside, the snow has lain longer on the ground this month than was ever known before in this valley; the weather has been very cold.

New England.—The ground was mostly bare throughout the month in the south, most of the snow for the month coming on the 27th or 30th. No damage has been reported to fruit trees during the month, but the indications are that grass, roots, and fall-sown grain have suffered slightly.

New Jersey.—Cape May City, this has been a remarkably mild January; no snow has fallen; the grass is green; the early spring bulbs are 2 inches above ground; and the farmers have done much of their spring sowing.

Oklahoma.—Buffalo, Beaver Co., the finest January ever known; cattle on range doing well and keeping fat on buffalo grass, requiring no extra feed. Lehigh, Choctaw Nation, weather favorable for stock. Keokuk Falls, plenty of rainfall will bring wheat through all right.

South Carolina.—The month was favorable for all crops, and the heavy general rains from the 6-11th, which were followed by unusual warmth, developed a vigorous stand of small grains. The consensus of all the reports indicates that wheat, oats, garden truck, fruits, and all other winter crops never looked more promising in January than they do this year.

South Dakota.—Reports indicate that the snow on the ranges west of the Missouri River has not been so deep as to interfere materially with the grazing of stock. All kinds of stock have done well, and reports indicate that the loss from cold and stormy weather will be unusually light.

Tennessee.—The cold wave of the 24th and 25th proved the most severe since 1886; it was more beneficial than damaging in its effects, as it served to arrest the growth of wheat and check the rise of sap in fruit trees. The close of the month finds wheat in excellent condition.

Utah.—Unless considerably more snow falls on the southern mountains during February and March, the following season will witness a scarcity of water in the southern part of the Territory. The precipitation for the month throughout the Territory was almost entirely in the form of snow; the average amount reported for the month was 13 inches.

Ohio.—The precipitation fell mostly during the earlier and later portions of the month, the latter being mostly in the form of snow, preceding the cold wave, and affording a fair protection to the cereals in the ground. The wheat generally advanced nicely during the month under the advantage of the excess of clear and fair days and above normal temperature. The number of days with precipitation was the least noted for January since the beginning of the service.

WIND.

PREVAILING WINDS.

The prevailing winds for January, 1894, viz., those that were recorded most frequently at Weather Bureau stations, are shown in the table of climatological data, but these are not given on Chart II, as has hitherto been the custom. The summary of State Weather Service reports also states the prevailing winds as recorded at voluntary stations, and according to these the most frequent winds in the respective States were as follows:

North.—Alabama.

Northeast.—Florida and South Carolina.

East.—Georgia.

Southeast.—None.

South.—Arkansas, Illinois, Kansas, Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, Texas, and Washington.

Southwest.—Arizona, Idaho, Indiana, Michigan, Montana, Nevada, North Carolina, Ohio, Virginia, and West Virginia.

West.—California, Colorado, New York, and Pennsylvania.

Northwest.—Indiana, Iowa, Minnesota, Nebraska, New England, North Dakota, South Dakota, Utah, Wisconsin, and Wyoming.

RESULTANT WINDS.

The resultants of all the hourly records of winds, as deduced from self-registers, are given in Table VIII in the latter part

of this REVIEW, in accordance with the announcement made in the REVIEW for December, 1893. The resultants deduced from observations at 8 a. m. and 8 p. m. at all stations of the second order, which are also those observations that appear on the morning and evening maps of the Weather Bureau, are given in Table IX. These latter resultants are also shown graphically on Chart II, where a small figure attached to each arrow shows the number of hours that this resultant prevailed, assuming each of the 62 observations to represent an hour's duration of a wind of average velocity. The smallness of these figures will indicate sometimes the infrequency of a given wind, but more often it represents the balance between winds from opposite directions. The actual north, south, east, and west components, on which these resultants are based, are given in detail in Table IX. The movement from the northwest has prevailed over New England and the middle and south Atlantic States; the movements from northeast and southeast have prevailed over the Gulf States, Tennessee, and Kentucky; the movement from southwest has prevailed over Ohio, Indiana, the lower Lake region, the upper Lake region, Minnesota, Montana, Washington, and Oregon.

HIGH WINDS.

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows. Maxi-

imum velocities are averages for 5 minutes; extreme velocities are gusts of shorter duration:

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles.				Miles.	
Amarillo, Tex.	5	50	w.	Galveston, Tex.	24	50	nw.
Atlantic City, N. J.	30	52	w.	Hatteras, N. C.	30	50	w.
Block Island, R. I.	12	50	nw.	Havre, Mont.	13	50	sw.
Do	13	50	nw.	Kittyhawk, N. C.	25	52	n.
Do	16	50	ne.	Nantucket, Mass.	27	52	ne.
Do	17	54	ne.	Do	29	58	se.
Do	29	68	e.	Do	30	51	nw.
Do	30	66	nw.	Pikes Peak, Colo.	1	84	w.
Boston, Mass.	29	51	ne.	Do	6	80	w.
Chicago, Ill.	20	51	s.	Do	7	97	w.
Cleveland, Ohio	11	54	w.	Do	16	80	w.
Do	12	52	w.	Do	20	102	w.
Colorado Springs, Colo.	16	60	sw.	Do	24	82	nw.
Do	20	73	nw.	Do	28	84	nw.
Do	21	63	nw.	Portland, Oregon	13	50	sw.
Do	28	53	nw.	Tatoosh Island, Wash.	12	58	s.
Eastport, Me.	29	57	ne.	Do	13	62	s.
Do	30	78	ne.	Do	15	60	w.
Fort Canby, Wash.	11	51	s.	Do	17	52	s.
Do	12	91	s.	Do	23	50	e.
Do	13	90	s.	Do	10	54	w.
Do	14	72	s.	Williston, N. Dak.	1	52	sw.
Do	15	78	sw.	Winnemucca, Nev.	12	62	nw.
Do	17	84	se.	Woods Holl, Mass.	13	50	nw.
Do	18	52	sw.	Do	25	52	nw.
Do	19	56	sw.	Do	30	68	nw.
Do	25	52	s.				

LOCAL STORMS.

5th.—During a thunderstorm at Gordonville, Mo., a house was struck by lightning.

7th.—A rainstorm began at Norfolk, Va., at 6.05 a. m., and ended at 4.10 p. m. A vessel was wrecked about 1 mile south of Little Island Life-Saving Station.

12th.—A windstorm, with a maximum velocity of 36 miles per hour, occurred at Baltimore, Md.; the roof of the city jail was blown off. At Olympia, Wash., high south winds and heavy rain prevailed during the 12th and 13th. The storm was reported very severe down Puget Sound, and electric wires were badly damaged. At Astoria, Oreg., rain occurred at intervals during the 12th, with high south winds, increasing in the late afternoon to a violent gale. The rain continued until 2.45 p. m.; 13th, began again at 7 p. m., and continued throughout the day. The storm was the most severe in a number of years, and damaged buildings and electric wires.

15th.—At Seattle, Wash., rain fell at intervals during the day, accompanied by high winds in the evening, attaining a maximum velocity of 37 miles per hour from the south at 7.30 p. m. Much damage was done to shipping; electric wires were prostrated; and washouts and landslides occurred on railroads.

20th.—At Oxford, Fla., high winds and a thunderstorm damaged timber. A thunderstorm began at Abilene, Tex., at 11 p. m. of the 19th and continued until 1 a. m., 20th. The wind reached a maximum velocity of 48 miles per hour. Some damage was done to outbuildings. A tornado passed over Dallas and Oak Cliff, Tex. The whirling wind was accompanied by thunder and vivid and continuous lightning. One person was killed. Galveston, Tex., thunderstorm, 1 person killed by lightning.

27th.—Heavy snowstorms occurred over New England and New York, delaying traffic. At Provincetown, Mass., trees were broken from the weight of the snow and damage was done to electric wires. At Nantasket Beach, Mass., the coast was strewn with wreckage.

29-30th.—A severe gale and snowstorm prevailed over New England and the middle Atlantic States. At Eastport, Me., the storm began the evening of the 29th, and by 6.55 a. m. of the 30th the wind had reached a maximum velocity of 78 miles per hour and an extreme velocity of 90 miles. There was very little shipping in port, and the tide being unusually low, the damage was not very great. The storm was the most severe since the opening of the Weather Bureau station (April, 1873), and nothing equaling it has occurred since September, 1869. At Gloucester, Mass., a heavy south-east gale prevailed during the 29th; a vessel was wrecked near Eastern Point. All along the New England coast a number of vessels were damaged. At Atlantic City, N. J., the wind attained a maximum velocity of 52 miles per hour and an extreme velocity of 60 miles; damage was done to electric wires. Throughout New York and Pennsylvania the snow was exceptionally heavy, and caused great delay to traffic and damage to electric wires. At Baltimore, Md., the wind reached a maximum velocity of 48 miles per hour from the west. The storm was the most severe in years. One person was blown down and considerably injured and another injured by flying debris. Considerable damage was done to property.

ATMOSPHERIC ELECTRICITY.

THUNDERSTORMS AND AURORAS.

The table on page 20 shows in detail for January, 1894, the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month.

THUNDERSTORMS.

A mention of the more severe thunderstorms reported during the month is given under "Local storms." The dates on which reports of thunderstorms were most numerous are the 4th and 5th, 19th and 20th, 23d and 24th. The dates on which reports were least numerous are the 1st, 2d, 21st, 25th, 30th, and 31st. The States from which the most numerous reports were received were: Alabama, Illinois, Louisiana, Missouri, and Texas.

AURORAS.

The evenings on which bright moonlight must have interfered with observations were from the 17th to 25th. On the remaining twenty-three evenings 209 reports were received, or an average of 7 per day. The dates on which the reported

number especially exceeded this average were the 2d, 3d, 4th, and 11th. The display of the 3d was reported from 115 stations. The only date on which thunderstorms and auroras were especially numerous were the 3d and 4th, respectively, as though the maximum of thunderstorms occurred shortly after the maximum of auroras.

The following special descriptions of the auroras of the 3d and 11th have been received:

Maine.—Indian Stream, 3d, an aurora was first noticed at 7.43 p. m. The northern half of the heavens was then covered with pale clouds, with here and there a patch of red, and an occasional movement like a faint flash from the northern horizon to zenith. Cloudiness increased rapidly until 8.13 p. m., when the whole heavens, except a small space at the southwest horizon, were covered by faint luminous clouds, which faded rapidly.

Massachusetts.—Boston, 3d, a dim auroral glow was observed at 6.15 p. m., and continued until 9.15 p. m., when it was obscured by clouds. It was most brilliant at 7.40 p. m., when the diffused light reached near the zenith. East Templeton, 3d, a very fine aurora. Between 6 and 7 p. m. 6 or 7 dark red streamers to the east and north; about 8 p. m., 2 distinct arches; at midnight, obscured by clouds.

New York.—Buffalo, 3d, a faint aurora first observed as a diffused patch of red light about 45° east of north, altitude 60°. Waves of light of a whitish, yellow color seemed to move from east to west, and were observed near the zenith; no arch visible. Oswego, 3d, an aurora was observed from 7.40 to

Thunderstorms and auroras, January, 1894.

States.	No. of stations.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	Total.		
Alabama	49	T.					1	1							5									6									13	T.	
Arizona	55	A.																															0	A.	
Arkansas	36	T.																			3			1						1			5	T.	
Colorado	74	A.																															0	A.	
California	318	T.		1						1					1	2		1			1												2	T.	
Connecticut	25	A.																															0	A.	
Delaware	5	T.	2	6																					1								9	T.	
District of Columbia	4	A.																															0	A.	
Florida	35	T.		1																									3	4			7	T.	
Georgia	54	A.														1																	2	A.	
Idaho	20	T.																															1	T.	
Illinois	56	A.			10	1	1																										12	A.	
Indiana	45	T.				5	1	1																									7	T.	
Indian Territory	8	A.																															1	A.	
Iowa	78	T.																															0	T.	
Kansas	63	A.	1									2																					3	A.	
Kentucky	39	T.		1																													2	T.	
Louisiana	50	A.				3	1			1	1					2				1	1				3	6				1			20	A.	
Maine	22	T.																															2	T.	
Maryland	25	A.		5		1																						2					9	A.	
Massachusetts	87	T.	1	6																													3	T.	
Michigan	71	A.																															23	A.	
Minnesota	71	T.																															4	T.	
Mississippi	41	A.	1	1	9							3				1	1																19	A.	
Missouri	92	T.					5	2													4	2											13	T.	
Montana	21	A.																															0	A.	
Nebraska	71	T.		2	2	1						3	1																				9	T.	
Nevada	46	A.																															0	A.	
New Hampshire	27	T.																															1	T.	
New Jersey	57	A.	1	9																													14	A.	
New Mexico	23	T.			10		2			1																							13	T.	
New York	80	A.																															0	A.	
North Carolina	56	T.	1	8		1	1																										3	T.	
North Dakota	36	A.																															3	A.	
Ohio	132	T.		3																														29	T.
Oklahoma	15	A.	1	11	5	2						3																					2	A.	
Oregon	62	T.																																	

7.55 p. m. and from 8.10 to 8.45 p. m. The display consisted of an irregular arch of diffused white light of 20° altitude and extending from northwest to east. Patches and waves of light reached to the zenith and were of a rose color, at times deepened to a ruby tint. The display was most brilliant at 7.45 p. m. From 8.10 to 8.45 p. m. the display consisted merely of an arch, and was very beautiful, as the colors were very strong. The display was observed in Syracuse.

District of Columbia.—Washington, 3d, an aurora was observed at 7.25 p. m. in the north, extending about 20° in azimuth toward the west. When first observed a few beams could be seen but soon blended into a diffused reddish light, which entirely disappeared at 8 p. m.

Minnesota.—St. Vincent, 3d, an aurora was observed at 8 p. m., which increased in brilliancy. Streamers extended from east to west, and reached the zenith in the shape of a cone. Later it formed a band on the horizon and disappeared about 10.30 p. m.

North Dakota.—Bismarck, 3d-4th, an aurora, consisting of an arch, with a dark segment below, from which occasional streamers would flash up to zenith, began at 7.20 p. m., 3d, and ended at 8 a. m., 4th. Altitude of summit of arch 40°, azimuthal span of arch 200°.

Montana.—Havre, 2-3d, an aurora began at 10.30 p. m., 2d. A pale, whitish light forming a broken auroral arch, altitude at crown of arch 30°,

azimuth of the ends, 100° to 260°. The display ended in the early morning of the 3d. Helena, 4th, an aurora, consisting of a pale, yellow light, with shooting beams and a well-defined dark segment, was observed from 12.10 a. m. to 1.25 a. m., when it was obscured by clouds. Altitude of the display 15°, shooting beams extended to 35°, azimuthal span of arch, 120°. Miles City, 11th, aurora visible from 8.30 p. m. to midnight, when observer retired. During greater part of evening it was merely a diffused light, but from 10.30 to 11 p. m., there were three successive arches superposed from the horizon upward at equal distances apart, and the apex of the uppermost arch was 45° in altitude and 60° azimuth, or span. The apices of the lower arches were directly under the apex of the uppermost, and the azimuthal span of the lowest was only one-third that of the uppermost. Three slender columns were seen in front of the aurora and about 50° in altitude. 12th, the aurora disappeared with the oncoming of daylight.

South Dakota.—Huron, 12th, a brilliant aurora was observed at intervals from 9.30 p. m. until after midnight. The form and appearance was very changeable. Sometimes numerous beams, reaching nearly to the zenith, prevailed and again the phenomenon was wholly a clearly-defined arch of white light over a very dark segment. The extremes of the display extended from about azimuth 140° to 220°, and altitude 75° to 80°. The beams were in constant motion and seemed to vibrate from side to side.

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for January, 1894, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 6.5 above the normal; maximum, 82, at Geneva, 7th; minimum, 3, at Florence and Newburg, 25th; greatest monthly range, 69 at Newburg; least monthly range, 45, at Eufaula and Oxanna.

Precipitation.—The average was 0.65 below the normal; greatest monthly, 9.38, at Newton; least monthly, 0.86, at Sturdevant.

Wind.—Prevailing direction, north.—F. P. Chaffee, Local Forecast Official, Weather Bureau, Montgomery, director.

ARIZONA.

Temperature.—Maximum, 84, at Parker, 26th; minimum, -19, at Flagstaff, 7th; greatest monthly range, 74, at Parker and Whipple Barracks; least monthly range, 40, at Peoria and Reymert.

Precipitation.—Greatest monthly, 2.00, at Flagstaff; least monthly, 0.00, at several stations.

Wind.—Prevailing direction, southwest.—W. Burrows, Observer, Weather Bureau, Tucson, director.

ARKANSAS.

Temperature.—The mean was 3.3 above the normal; maximum, 77, at Bee Branch and Fort Smith, 16th; minimum, -22, at Rogers, 24th; greatest monthly range, 97, at Rogers; least monthly range, 60, at Brinkley.

Precipitation.—The average was 1.08 below the normal; greatest monthly, 8.58, at Hamburg; least monthly, 1.48, at Conway.

Wind.—Prevailing direction, south.—F. H. Clarke, Local Forecast Official, Weather Bureau, Little Rock, director; G. G. Harkness, Observer, Weather Bureau, assistant.

CALIFORNIA.

Temperature.—The mean was 0.8 below the normal; maximum, 83, at Indio, 28th; minimum, -22, at Boca, 6th; greatest monthly range, 61, at Tehachapi; least monthly range, 18, at Point Lobos.

Precipitation.—The average was 0.51 above the normal; greatest monthly, 27.56, at Upper Mattole; least monthly, trace, at Keeler.

Wind.—Prevailing direction, west.—J. A. Barwick, Observer, Weather Bureau, Sacramento, director.

COLORADO.

Temperature.—The mean was 2.0 above the normal; maximum, 80, at Downing, 15th and 17th; minimum, -35, at Gunnison, 19th; greatest monthly range, 95, at Downing; least monthly range, 47, at Watkins.

Precipitation.—The average was 0.25 below the normal; greatest monthly, 4.83, at Climax; least monthly, 0.00, at Canyon City, Las Animas, and Watkins.

Wind.—Prevailing direction, west.—J. J. Gilligan, Observer, Weather Bureau, Denver, director.

FLORIDA.

Temperature.—The mean was 1.5 above the normal; maximum, 85, at Plant City, 8th; minimum, 27, at Pensacola, 26th; greatest monthly range, 53, at Plant City; least monthly range, 19, at Key West.

Precipitation.—The average was 0.09 below the normal; greatest monthly, 4.35, at Titusville; least monthly, 0.46, at Manatee.

Wind.—Prevailing direction, northeast.—E. R. Demain, Observer, Weather Bureau, Jacksonville, director.

GEORGIA.

Temperature.—Maximum, 79, at Darien, 6th, 13th, and 17th, at Fleming,

5th, at Poulan, 7th, at Columbus, 16th; minimum, 16, at Adairsville and Lafayette, 25th; greatest monthly range, 60, at Darien and Lawrenceville; least monthly range, 40, at Lafayette and Toocoa.

Precipitation.—Greatest monthly, 6.76, at Dahlonga; least monthly, 0.75, at Brag.

Wind.—Prevailing direction, east.—Park Morrill, Local Forecast Official, Weather Bureau, Atlanta, director.

IDAHO.

Temperature.—Maximum, 62, at Nampa, 15th; minimum, -26, at Lake, 23d.

Precipitation.—Greatest monthly, 8.50, at Fort Sherman; least monthly, 0.30, at Oakley.

Wind.—Prevailing direction, southwest.—J. H. Smith, Observer, Weather Bureau, Idaho Falls, director.

ILLINOIS.

Temperature.—The mean was 7.0 above the normal; maximum, 73, at Griggsville, 17th; minimum, -26, at Dixon, 25th.

Precipitation.—The average was 0.11 below the normal; greatest monthly, 3.09, at Carlinville; least monthly, 1.05, at Bushnell.

Wind.—Prevailing direction, south.—John Craig, Observer, Weather Bureau, Springfield, director.

INDIANA.

Temperature.—The mean was 7.7 above the normal; maximum, 68, at Marengo, 17th; minimum, -17, at Lafayette; greatest monthly range, 73, at Lafayette and Marengo; least monthly range, 59, at Angola.

Precipitation.—The average was 0.63 below the normal; greatest monthly, 4.10, at Huntingburg; least monthly, 1.29, at Hammond.

Wind.—Prevailing direction, southwest.—Prof. H. A. Huston, Lafayette, director; C. F. R. Wappenhans, Local Forecast Official, Weather Bureau, assistant.

IOWA WEATHER AND CROP SERVICE.

Temperature.—The mean was 3.0 above the normal; maximum, 85, at Centerville, 21st; minimum, -37, at Ames, 25th; greatest monthly range, 112, at Centerville; least monthly range, 68, at Algona.

Precipitation.—The average was 0.26 below the normal; greatest monthly, 2.24, at Keokuk; least monthly, 0.31, at Humboldt.

Wind.—Prevailing direction, northwest.—J. R. Sage, Des Moines, director; G. M. Chappel, Local Forecast Official, Weather Bureau, assistant.

KANSAS.

Temperature.—The mean was 2.1 above the normal; maximum, 77, at Englewood, 16th; minimum, -26, at Achilles and Colby, 24th; greatest monthly range, 100, at Achilles; least monthly range, 80, at Cawker City.

Precipitation.—The average was 0.14 below the normal; greatest monthly, 3.45, at Sedan; least monthly, trace, at several stations.

Wind.—Prevailing direction, south.—T. B. Jennings, Observer, Weather Bureau, Topeka, director.

KENTUCKY.

Temperature.—The mean was 4.9 above the normal; maximum, 78, at Franklin, 24th; minimum, -12, at Pellville, 25th; greatest monthly range, 83, at Franklin; least monthly range, 58, at Catlettsburg.

Precipitation.—The average was 1.27 below the normal; greatest monthly, 4.30, at Caddo; least monthly, 1.56, at Carrollton.

Wind.—Prevailing direction, southwest.—Frank Burke, Local Forecast Official, Weather Bureau, Louisville, director.

LOUISIANA.

Temperature.—The mean was 3.5 above the normal; maximum, 83, at Maurepas, 6th, and at Abbeville, 16th; minimum, 12, at Natchitoches, 26th; greatest monthly range, 67, at Liberty Hill; least monthly range, 34, at Port Eads.

Precipitation.—The average was 0.08 above the normal; greatest monthly, 9.08, at Farmerville; least monthly, 0.90, at Houma.

Wind.—Prevailing direction, south.—*R. E. Kerkam, Local Forecast Official, Weather Bureau, New Orleans, director.*

MARYLAND.

Temperature.—The mean was 2.1 above the normal; maximum, 67, at Cumberland (b), 22d; minimum, 3, at Sunnyside, 26th; greatest monthly range, 53, at Sunnyside; least monthly range, 31, at Cambridge.

Precipitation.—The average was 1.61 below the normal; greatest monthly, 3.70, at Oakland; least monthly, 1.19, at New Market.

Wind.—Prevailing direction, northwest.—*Dr. William B. Clark, Johns Hopkins University, Baltimore, director; Prof. Milton Whitney, Maryland Agricultural College, secretary and treasurer; C. P. Cronk, Observer, Weather Bureau, in charge.*

MICHIGAN.

Temperature.—The mean was 3.8 above the normal; maximum, 63, at Adrian, 18th; minimum, —23, at Crystal Falls, 25th; greatest monthly range, 75, at Crystal Falls; least monthly range, 44, at Berrien Springs (a).

Precipitation.—The average was 0.30 below the normal; greatest monthly, 5.30, at Benzonia; least monthly, 0.50, at Crystal Falls.

Wind.—Prevailing direction, southwest.—*E. A. Evans, Local Forecast Official, Weather Bureau, Detroit, director.*

MINNESOTA.

Temperature.—The mean was 2.7 above the normal; maximum, 54, at Minnesota City, 17th, and at Pokegama Falls, 18th; minimum, —47, at Pokegama Falls, 25th; greatest monthly range, 101, at Pokegama Falls; least monthly range, 64, at Bird Island and Wilmar.

Precipitation.—The average was 0.11 below the normal; greatest monthly, 1.70, at Rolling Green; least monthly, 0.26, at Ada and Alexandria.

Wind.—Prevailing direction, northwest.—*E. A. Beals, Observer, Weather Bureau, Minneapolis, director.*

MISSISSIPPI.

Temperature.—The mean was 5.0 above the normal; maximum, 82, at Hattiesburg, 6th, at Leakesville, 16th, and at Vaiden, 17th; minimum, zero, at Hernando, 25th; greatest monthly range, 71, at Vaiden; least monthly range, 48, at Biloxi.

Precipitation.—The average was 0.25 below the normal; greatest monthly, 7.48, at French Camp and Woodville; least monthly, 1.59, at Biloxi.

Wind.—Prevailing direction, south.—*R. J. Hyatt, Local Forecast Official, Weather Bureau, Vicksburg, director.*

MISSOURI.

Temperature.—The mean was 3.9 above the normal; maximum, 77, at Mount Vernon and Neosho, 16th; minimum, —35, at Grovedale, 25th; greatest monthly range, 110, at Grovedale; least monthly range, 66, at Gorin.

Precipitation.—The average was 0.22 above the normal; greatest monthly, 5.36, at Neosho; least monthly, 0.20, at Vancleve and Cowgill.

Wind.—Prevailing direction, south.—*J. R. Rippey, Secretary, State Board of Agriculture, Columbia, director; E. H. Nimmo, Observer, Weather Bureau, assistant.*

MONTANA.

Temperature.—The mean was 5.0 above the normal; maximum, 63, at Mingsville, 14th; minimum, —38, at Mingsville, 24th; greatest monthly range, 101, at Mingsville; least monthly range, 61, at Red Rock.

Precipitation.—The average was 0.60 above the normal; greatest monthly, 2.36, at Martinsdale; least monthly, 0.30, at Glasgow.

Wind.—Prevailing direction, southwest.—*J. M. Sherier, Observer, Weather Bureau, Helena, director.*

NEBRASKA.

Temperature.—The mean was 1.0 above the normal; maximum, 82, at Indianola, 15th; minimum, —38, at Valentine, 24th; greatest monthly range, 108, at Indianola; least monthly range, 71, at York.

Precipitation.—The average was 0.12 below the normal; greatest monthly, 1.80, at Lexington; least monthly, 0.07, at Crete.

Wind.—Prevailing direction, northwest.—*George E. Hunt, Local Forecast Official, Weather Bureau, Omaha, director.*

NEVADA.

Temperature.—The mean was 2.2 above the normal; maximum, 70, at Belleville, 29th; minimum, —30, at Halleck, 9th; greatest monthly range, 83, at Ely; least monthly range, 46, at Virginia City.

Precipitation.—The average was 0.07 below the normal; greatest monthly, 5.53, at Lewers Ranch; least monthly, 0.09, at Saint Clair.

Wind.—Prevailing direction, southwest.—*Prof. Charles W. Friend, Carson City, director; F. A. Carpenter, Observer, Weather Bureau, assistant.*

NEW ENGLAND.

Temperature.—The mean was 2.8 above the normal; maximum, 58, at

Vineyard Haven, 25th, and at Lake Cochituate, 4th; minimum, —40, at Fort Kent, 11th; greatest monthly range, 88, at Houlton; least monthly range, 40, at New Haven.

Precipitation.—The average was 0.86 below the normal; greatest monthly, 5.77, at Hyannis; least monthly, 1.20, at North Conway.

Wind.—Prevailing direction, northwest.—*J. Warren Smith, Weather Bureau, Boston, director.*

NEW JERSEY.

Temperature.—The mean was 4.7 above the normal; maximum, 61, at Elizabeth, 24th; minimum, —4, at River Vale, 28th; greatest monthly range, 56, at River Vale and Somerville; least monthly range, 34, at Ocean City, Cape May C. H., and Cape May.

Precipitation.—The average was 1.54 below the normal; greatest monthly, 3.80, at Tenaflly; least monthly, 1.18, at Blairstown.

Wind.—Prevailing direction, northwest.—*E. W. McGann, Observer, Weather Bureau, New Brunswick, director.*

NEW MEXICO.

Temperature.—The mean was about normal; maximum, 72, at Fort Wingate, 17th; minimum, —19, at Monero, 7th; greatest monthly range, 80, at Fort Wingate; least monthly range, 41, at Coolidge.

Precipitation.—Greatest monthly, 1.60, at Chama; least monthly, 0.00, at several stations.—*H. B. Hersey, Observer, Weather Bureau, Santa Fe, director.*

NEW YORK.

Temperature.—The mean was 4.5 above the normal; maximum, 60, at Factoryville, 4th; minimum, —13, at Saranac Lake, 12th and 13th; greatest monthly range, 63, at Friendship; least monthly range, 35, at Fort Niagara.

Precipitation.—The average was 0.03 below the normal; greatest monthly, 5.65, at Ogdensburg; least monthly, 1.35, at Deposit.

Wind.—Prevailing direction, west.—*Prof. E. A. Fuytes, Dean of the College of Civil Engineering, Cornell University, Ithaca, director; R. M. Harding, Observer, Weather Bureau, assistant.*

NORTH CAROLINA.

Temperature.—The mean was 2.9 above the normal; maximum, 75, at Sloan, 7th, and at Wilmington, 6th; minimum, 11, at Blowing Rock and Columbus, 26th; greatest monthly range, 54, at Columbus; least monthly range, 29, at Hatteras.

Precipitation.—The average was 0.61 below the normal; greatest monthly, 10.34, at Lewiston; least monthly, 1.45, at Cullowhee.

Wind.—Prevailing direction, southwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Observer, Weather Bureau, assistant.*

NORTH DAKOTA.

Temperature.—The mean was 1.2 above the normal; maximum, 60, at New Salem, 14th; minimum, 47, at Willow City, 7th; greatest monthly range, 95, at New Salem; least monthly range, 70, at Power and Napoleon.

Precipitation.—The average was 0.25 below the normal; greatest monthly, 1.30, at Milton; least monthly, 0.06, at Gallatin.

Wind.—Prevailing direction, northwest.—*E. H. Bronson, Observer, Weather Bureau, Bismarck, director.*

OHIO WEATHER AND CROP SERVICE.

Temperature.—The mean was 6.9 above the normal; maximum, 66, at Annapolis, 5th, and at Cherry Fork, 18th; minimum, —16, at Spring Valley, 25th; greatest monthly range, 71, at Hillsboro; least monthly range, 46, at Millport.

Precipitation.—The average was 1.01 below the normal; greatest monthly, 3.60, at Greenfield; least monthly, 0.69, at Pomeroy.

Wind.—Prevailing direction, southwest.—*L. N. Bonham, Columbus, director; C. M. Strong, Observer, Weather Bureau, assistant.*

OKLAHOMA.

Temperature.—The mean was 2.0 above the normal; maximum, 80, at Buffalo, 3d, and at Purcell, 16th; minimum, —15, at Clifton, 25th; greatest monthly range, 93, at Clifton; least monthly range, 70, at Gwenddale.

Precipitation.—Greatest monthly, 3.91, at Burnett; least monthly, trace, at Buffalo.

Wind.—Prevailing direction, south.—*J. I. Widmeyer, Observer, Weather Bureau, Oklahoma City, director.*

PENNSYLVANIA.

Temperature.—The mean was 4.1 above the normal; maximum, 65, at Somerset, 23d; minimum, —9, at Shingle House, 26th; greatest monthly range, 63, at Smethport; least monthly range, 39, at Harrisburg.

Precipitation.—The average was 1.18 below the normal; greatest monthly, 4.71, at Kane; least monthly, 0.83, at Selins Grove.

Wind.—Prevailing direction, west.—*Under direction of the Franklin Institute, Philadelphia: W. P. Tatham, director; T. F. Townsend, Local Forecast Official, Weather Bureau, assistant.*

SOUTH CAROLINA.

Temperature.—The mean was 2.7 above the normal; maximum, 80, at Trial, 6th and 16th; minimum, 19, at Brewer Mine, 18th.

Precipitation.—The average was 1.32 below the normal; greatest monthly, 5.94, at Hollands Store; least monthly, 1.19, at Port Royal.

Wind.—Prevailing direction, northeast.—*J. W. Bauer, Observer, Weather Bureau, Columbia, director.*

SOUTH DAKOTA.

Temperature.—The mean was 0.5 below the normal; maximum, 61, at Spearfish, 15th; minimum, —39, at Forestburg and Frankfort, 24th; greatest monthly range, 89, at Rosebud; least monthly range, 70, at Oelrichs.

Precipitation.—The average was 0.20 above the normal; greatest monthly, 1.92, at Webster; least monthly, 0.11, at Brookings.

Wind.—Prevailing direction, northwest.—*S. W. Glenn, Local Forecast Official, Weather Bureau, Huron, director.*

TENNESSEE WEATHER AND CROP SERVICE.

Temperature.—The mean was 5.9 above the normal; maximum, 72, at Memphis, 17th; minimum, —6, at Clarksville, 25th; greatest monthly range, 75, at Clarksville; least monthly range, 43, at Rogersville.

Precipitation.—The average was 0.70 below the normal; greatest monthly, 7.20, at Waynesboro; least monthly, 1.83, at Strawberry Plains.

Wind.—Prevailing direction, south.—*J. B. Marbury, Local Forecast Official, Weather Bureau, Nashville, director.*

TEXAS.

Temperature.—The mean was 3.4 above the normal; maximum, 95, at Twohig, 20th; minimum, —15, at Corsicana (a), 24th; greatest monthly range, 96, at Wichita Falls; least monthly range, 48, at Galveston.

Precipitation.—The average was 0.65 below the normal; greatest monthly, 5.20, at Hallettsville; least monthly, 0.00, at Fort Hancock.

Wind.—Prevailing direction, south.—*D. D. Bryan, Galveston, director; I. M. Cline, Local Forecast Official, Weather Bureau, assistant.*

UTAH.

Temperature.—Maximum, 63, at Saint George, 29th; minimum, —24, at Fort Duchesne, 6th; greatest monthly range, 77, at Heber; least monthly range, 41, at Castle Gate.

Precipitation.—Greatest monthly, 6.60, at Silver Lake; least monthly, trace, at Singletree.

Wind.—Prevailing direction, northwest.—*G. N. Salisbury, Observer, Weather Bureau, Salt Lake City, director.*

VIRGINIA.

Temperature.—Maximum, 73, at Avon, 5th; minimum, 8, at Big Stone

Gap, 24th and 25th; greatest monthly range, 62, at Avon; least monthly range, 33, at Cape Charles.

Precipitation.—Greatest monthly, 3.86, at Birdsneest; least monthly, 0.94, at Stephens City.

Wind.—Prevailing direction, southwest.—*Dr. E. A. Craighill, Lynchburg, director; J. N. Ryker, Observer, Weather Bureau, assistant.*

WASHINGTON.

Temperature.—The mean was about normal; maximum, 67, at Lapush, 30th; minimum, —14, at Rosalia, 8th; greatest monthly range, 60, at Rosalia; least monthly range, 21, at Fort Canby.

Precipitation.—The average was 1.34 above the normal; greatest monthly, 18.50, at Neah Bay; least monthly, 1.08, at Lakeside.

Wind.—Prevailing direction, south.—*H. F. Alciatore, Observer, Weather Bureau, Seattle, director.*

WEST VIRGINIA.

Temperature.—Maximum, 70, at Davis, 1st; minimum, —4, at Sandyville, 25th; greatest monthly range, 67, at Spencer; least monthly range, 49, at Martinsburg.

Precipitation.—Greatest monthly, 4.23, at Beverly; least monthly, 0.83, at Raleigh.

Wind.—Prevailing direction, west.—*W. W. Dent, Observer, Weather Bureau, Parkersburg, director.*

WISCONSIN.

Temperature.—The mean was 3.5 above the normal; maximum, 59, at Prairie du Chien, 24th; minimum, —42, at Osceola and Barron, 24th.

Precipitation.—Greatest monthly, 2.70, at Crandon; least monthly, 0.78, at Pepin.

Wind.—Prevailing direction, northwest.—*W. L. Moore, Local Forecast Official, Weather Bureau, Milwaukee, director.*

WYOMING.

Temperature.—Maximum, 68, at Wheatland, 15th; minimum, —36, at Sheridan, 24th; greatest monthly range, 90, at Wheatland; least monthly range, 54, at Camp Pilot Butte.

Precipitation.—Greatest monthly, 1.82, at Fort Yellowstone; least monthly, 0.03, at Laramie.

Wind.—Prevailing direction, northwest.—*E. M. Ravenscraft, Observer, Weather Bureau, Cheyenne, director.*

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS.

The following table shows the danger point at each river station; the highest and lowest stages for the month of January, 1894, with the dates of occurrence, and the monthly range:

Heights of rivers above low-water mark, January, 1894.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Shreveport, La.	29.2	6.4	31	—0.6	13	7.0
Arkansas River.						
Fort Smith, Ark.	22.0	11.6	22	0.0	10	11.6
Little Rock, Ark.	23.0	12.7	24	3.5	10-13	9.2
Missouri River.						
Pierre, S. Dak.	13.0					
Sioux City, Iowa	18.7	7.0	19	4.9	17	2.1
Kansas City, Mo.	21.0					
Mississippi River.						
St. Paul, Minn.	14.0					
La Crosse, Wis.	10.0					
Dubuque, Iowa	16.0					
Davenport, Iowa	15.0					
Keokuk, Iowa	14.0	2.3	24	0.4	8	1.9
Hannibal, Mo.	17.0	3.2	14	—1.4	26	4.6
St. Louis, Mo.	30.0	4.0	25	0.6	30	3.4
Cairo, Ill.	40.0	18.1	26, 27	9.2	4	8.9
Memphis, Tenn.	33.0	12.3	29	5.7	7	6.6
Vicksburg, Miss.	41.0	17.4	31	6.2	11, 12	11.2
New Orleans, La.	13.0	5.9	24	3.4	14, 15	2.5
Ohio River.						
Parkersburg, W. Va.	38.0	12.9	9	8.0	15	4.9
Cincinnati, Ohio	45.0	21.0	6	15.4	18	5.6
Louisville, Ky.	24.0	9.1	6	7.3	19	1.8
Cumberland River.						
Nashville, Tenn.	40.0	13.2	25	2.8	3	10.4
Tennessee River.						
Chattanooga, Tenn.	33.0	9.3	9	2.9	1	6.4
Knoxville, Tenn.	29.0	6.0	8	1.6	1	4.4
Monongahela River.						
Pittsburg, Pa.	22.0	9.3	7	3.3	15	6.0
Savannah River.						
Augusta, Ga.	32.6	17.5	12	7.2	6, 7	10.3
Willamette River.						
Portland, Oregon	15.0	19.5	18	4.8	2, 6	14.7

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Susquehanna River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Harrisburg, Pa.	17.0	5.2	8, 9	2.4	24-27	2.8
Alabama River.						
Montgomery, Ala.	48.0	18.9	13	2.7	6	16.2
James River.						
Lynchburg, Va.	18.0	1.7	7	0.8	26	0.9
Sacramento River.						
Red Bluff, Cal.	22.0	25.0	15	1.8	13	23.2
Sacramento, Cal.	25.0					
Des Moines River.						
Des Moines, Iowa	19.0					

* Frozen.

† For 19 days.

‡ For 24 days.

§ For 30 days.

FLOODS.

The above table shows that during the month of January the only rivers that have experienced especial high water were the Willamette, which was above the danger point on the 18th, and the Sacramento, which rose rapidly on the 12th and was above the danger point on the 15th.

CLOSING OF NAVIGATION.

The weekly "bulletin of snow lying on the ground" gives reports of ice in rivers and harbors, and shows that on Monday, January 1, ice was sufficiently thick to impede navigation above Davenport, Iowa, and Kansas City, Mo.; no important obstruction existed in the Hudson River. On the 8th there were 3 inches at Albany, N. Y.; 2 inches at Davenport, Iowa; 18 inches at St. Paul, Minn.; 11 inches at Omaha, Nebr., and 28 inches at Williston, N. Dak. On the 15th there were 6 inches at Albany, N. Y.; 17 inches at St. Paul, Minn.; 5 inches at Davenport, Iowa; 26 inches at Williston, N. Dak.,

and 11 inches at Omaha, Nebr. On the 22d there were 6 inches at Albany, N. Y.; 20 inches at St. Paul, Minn.; none at Dubuque and Davenport, Iowa; 15 inches at La Crosse, Wis.; 28 inches at Williston, N. Dak.; 23 inches at Yankton, S. Dak.; 7.5 inches at Omaha, Nebr. On the 29th the reported thickness of ice in inches was as follows:

Hudson River.—Albany, N. Y., 8.

Upper Mississippi River.—St. Paul, Minn., 20.5; La Crosse, Wis., 22; Dubuque, Iowa, 10; Davenport, Iowa, 8; Keokuk, Iowa, 7.5; Hannibal, Mo., 8.

Upper Missouri River.—Williston, N. Dak., 24; Bismarck, N. Dak., 30; Pierre, S. Dak., 25; Yankton, S. Dak., 21; Sioux City, Iowa, 18; Omaha, Nebr., 15; Kansas City, Mo., 6.

Platte River.—North Platte, Nebr., 16.

Lake Superior.—Duluth, Minn., 21; Sault Ste. Marie, Mich., 19.

Lake Michigan.—Green Bay, Wis., 18; Chicago, Ill., 5; Grand Haven, Mich., 2.

Lake Huron.—Alpena, Mich., 4.

Lake Erie.—Toledo, Ohio, 4; Sandusky, Ohio, 4.5; Cleveland, Ohio, 3; Erie, Pa., 2.5; Buffalo, N. Y., 2.

Lake Ontario.—Oswego, N. Y., 4.

The following special reports have also been collected:

Alleghany River.—Pittsburg, Pa., 27th to 31st, floating ice.

Detroit River.—Detroit, Mich., 7th and 8th, closed by ice in morning, but soon opened by ferry boats.

Hudson River.—Albany, N. Y., 1st, floating ice; 3d, frozen from shore to shore.

Mississippi River.—Dubuque, Iowa, 8th, frozen over; 17th, channel partly open, but full of floating ice; 18th, only a small quantity of floating ice; 21st, open at Eagle Point, a few miles north, and in front of this place below the bridge; 22d, open from Eagle Point to this place; 24th, again frozen. Fort Madison, Iowa, 23d, frozen during the night. Hannibal, Mo., 25th, frozen. Le Claire, Iowa, 20th, ice broken up; 22d, frozen again.

Missouri River.—Hermann, Mo., 8th and 10th, floating ice; 11th, gorged; 24th, heavy floating ice; 25th, frozen.

Ohio River.—Marietta, Ohio, 28th to 31st, floating ice. Parkersburg, W. Va., 29th to 31st, running ice. Wheeling, W. Va., 13th, floating ice; 27th to 31st, floating ice.

Lake Erie.—Cleveland, Ohio, 12th, 25th to 31st, floating ice.

Lake Huron.—Port Huron, Mich., 1st to 12th, 24th, 25th, 30th, and 31st, floating ice; 25th, the Black River frozen over.

Lake Superior.—Marquette, Mich., 25th, harbor frozen over.

Wisconsin.—Rock River, ice 11 inches thick. Rock Lake, ice 14 inches thick. Hartford, ice 14 inches thick, the ground frozen 4 inches deep.

Minnesota.—Excel, Thief River, at the end of the month, ice 28 inches thick. Minneapolis, ice 22 inches thick on the lake. Marfield, ice 30 inches thick on lakes and ponds. Blooming Prairie, ice 2 feet thick on Cedar River; Willmar, ice 28 inches thick on lakes.

OBSERVATIONS ON THE GREAT LAKES.

Owing to the closing of navigation on the Great Lakes during the winter season the Weather Bureau has received reports for the month of January from no vessels and from only 10 U. S. Life-Saving stations.

SURFACE CURRENTS.

The collection of floating bottles for the determination of currents is necessarily interfered with by the presence of ice, but the drift of the ice itself should be noted by those interested in this class of observations. A discussion by Prof. M. W. Harrington of the results of the work done by the Weather Bureau in 1892 and 1893 has been published in an official circular, Bulletin B, from which the following extracts are taken:

The investigations of this paper relate to the season of navigation and the currents that appear on the maps are practically the currents of the summer season. It is entirely possible that the currents of the other seasons would show some variations.

A. The Lakes all have an outflow, and there must be a general motion of the water toward this outflow; the speed of this body current is very slight.

B. The winds have a great effect on the currents, and the most frequent winds on the Great Lakes are shown in the proper tables, from which it appears that 30 per cent are from the southwest, 22 per cent from the west, 14 per cent from the northwest, 10 per cent from the northeast, 14 per cent from the south, 5 per cent from the southeast, 3 per cent from the north, and 1 per cent from the east. The general resultant wind during the summer months is westerly, but at a few stations it is easterly.

C. The return currents.—It will be observed that, in the case of three of the lakes, the main currents hug one shore. In the case of Lake Superior, it is the southern shore; in the case of Lake Michigan, it is the eastern shore; and in that of Lake Huron, it is the western shore. In the case of Lake Erie and Lake Ontario this phenomenon does not appear so plainly. This feature can be explained by the two sorts of currents already mentioned, combined with the lay of the lakes, as to the prevailing direction of the wind and the position of the outlet. In the case of Lake Superior the outlet is on the southern side. In the case of Lake Michigan the readiest access to the outlet is along the eastern shore, the access from other directions being barred by

the group of islands near the northern end of the lake. In the case of Lake Huron the outlet is on the western side, as are also the inlets of the lake.

In any case the drive of the water from one end of the lake to the other necessitates more or less a return current, providing the outlet is not sufficiently large to allow this water to pass through. In the Great Lakes the outlets are relatively small, so that in all these cases there must be return currents. Such currents will combine with the direct ones to make a large general whirl in the lake if the latter is sufficiently broad (lakes Superior and Huron), or lies across the wind (lakes Huron and Michigan). If the lake has its long axis in the direction of the wind (lakes Erie and Ontario), the return currents will break up into smaller whirls along the great pockets of the coast on either side of the general current. Around groups of islands a smaller return current, or a distinct swirl, will be set up. All these cases are illustrated in the detailed discussion which follows.

D. Surf motion.—A wave which is not breaking does not necessarily carry forward a body floating on its surface, but so soon as it breaks, the surf on the crest of the wave will carry with it any body which happens to be floating in it. The result of this is that while a body is outside of the surf it is carried on by the general drift of the water. So soon as it comes within the surf it advances more or less rapidly in the direction in which the surf is moving. Now, the surf occurs generally in shallow water and seeks the shore. Therefore, the bottle papers will be found to have a decided tendency shoreward whenever they come within its vicinity, and especially so when the water is shallow. This may be the general shore, or it may be the shore of islands within the lake. Moreover, there is a very curious phenomenon occasionally appearing on the maps, which can also be accounted for by this surf motion. This is the tendency of the bottles to pass into deep bays and along their length, and to be lodged on the shore somewhere near the bottom of the bay. This is undoubtedly due to surf motion. Generally speaking, the waves in these long bays move up the bay, and have more or less surf. The body floating on them will also move up the bay, and its tendency will be to pass up the entire length of the bay, or nearly so.

The attention of the Weather Bureau will be directed in the season of 1894 more especially to the recovery of the bottles which have been floated but not yet found. It appears, as already stated, that probably not 10 per cent of the bottles have been recovered. It will be comparatively easy to search the shores with reference to recovering others, and it is hoped that a large number can be added to throw further light on the character of the currents of the Great Lakes. Navigators of the Lakes, fishermen, residents on the shores, and others who have occasion to visit the shore are earnestly requested to make every effort to recover what bottles are lying there, and to return to the Weather Bureau the inclosed paper, with the proper memoranda.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine received by the atmosphere above the cloud layer, on any given day or month, is constant from year to year, and the heat attending this sunshine is sensibly constant, although there are some indications of a barely

appreciable variation in this heat associated with the condition of the sun's surface. On the other hand, at the surface of the earth the distribution of sunshine (and therefore, of the resulting heat, ascending currents of air, winds, evapora-

tion, the growth of plants, and other important effects) depends mostly upon the distribution of cloudiness.

Cloudiness.—The number of clear and cloudy days and the average cloudiness between sunrise and sunset are given for each Weather Bureau station in Table I. These means are based upon personal observations made during the day sufficiently often to secure a correct average cloudiness. The complements of the estimated percentages give the observer's estimated duration of sunshine, and these numbers are given in the last column of Table IV as supplementary to the registered duration, in the preceding column. The close accord of these numbers, in most cases, is very satisfactory.

The occasional large discordance between the monthly sunshine as estimated by the observers and as registered by the instruments shows how impossible it is for personal estimates to compete with continuous self-registers.

Sunshine.—At the present time an instrumental record of the amount of sunshine is kept at 15 stations by means of the "photographic sunshine recorder," and at 19 stations an equivalent record is kept by means of the "thermographic sunshine recorder." A description of these instruments and the method of dealing with the record is given on a subsequent page. The results of the observations for January, 1894, are given in Table IV. This table shows the actual sunshine received, on the average, for any hour of local mean time during the month; it is recorded as a percentage of

the greatest possible amount of sunshine; for instance, the sun might possibly always shine during the whole hour ending at 1 p. m., whereas, at Baltimore, Md., it has, on the average, been cloudy 32 per cent of this hour, so that only 68 per cent of full sunshine has been received. Again, at the time of sunrise, between 7 and 8 a. m., during January, Baltimore records 13 per cent of sunshine, which means not 13 per cent of the thirty-one whole hours between 7 and 8 a. m., but 13 per cent of that portion of these hours during which the sun was above the visible horizon of that station; the remaining 87 per cent was cut off by clouds and fog. On the average both kinds of self-registers agree in giving 5.5 per cent more sunshine than the personal estimates by the observer.

The stations recording the largest percentage of sunshine between 11 a. m. and 1 p. m. are Colorado Springs, Colo., 83.5; Denver, Colo., 82.5; Key West, Fla., 81; San Diego, Cal., 89; Santa Fe, N. Mex., 83.5. Those having the least are Cleveland, Ohio, 39; Portland, Oreg., 23.5; Galveston, Tex., 41.5.

The next to the last column of Table IV gives the general average sunshine for the whole month for all hours of daylight; the highest percentages are San Diego, Cal., 84; Santa Fe, N. Mex., 79. The lowest averages are Portland, Oreg., 19; Cleveland, Ohio, 33; Buffalo, N. Y., 36; Galveston, Tex., 40. The low average for Portland, Oreg., is, of course, in keeping with the cloudiness of its rainy season.

NOTES BY THE EDITOR.

ELASTIC SUSPENSION FOR INSTRUMENTS.

Over fifty years ago Prof. G. B. Airy, Director of the Royal Observatory at Greenwich, desired to establish a shallow dish of mercury so that the pure reflecting surface of the liquid could be used for astronomical observations without being subject to the annoying tremors that ran over this surface whenever wagons, railroad trains, or even human footsteps jarred the earth around the pier on which it stood. He achieved perfect success by suspending the dish of mercury by a number of elastic springs. No matter how much the pier and, therefore, the upper ends of these springs were jarred, the minute vibrations did not run down through the springs to the basin of mercury, but were completely broken up on their way. In 1889 the present editor desired to support the Richard barograph on the U. S. S. *Pensacola* in such a manner that it should be free from all the effects of the jarring due to the engines and screw as well as from the effects of the rolling and pitching of the vessel. This again was accomplished perfectly by setting the instrument on a small shelf that hung suspended by long coiled springs at the four corners.

The "Washington State Weather Reporter," published by the State Weather Service at Seattle, describes the application of this principle to the suspension of maximum and minimum thermometers. Prof. L. P. Venen, of Vashon College, is the inventor of this method, which is described as follows: A rather heavy block of wood is suspended by a thick spiral spring from the ceiling of the ordinary thermometer shelter; one or more elastic cords are stretched from the block to the sides of the shelter, and thus keep the block from swinging with the wind; the maximum and minimum and other thermometers are fastened on the block and can, therefore, receive no violent, injurious shock from the outside; they are even safe from the slight jars due to the wind or other influences by means of which the index of the minimum thermometer is very apt to slip down too low.

Doubtless other applications of this method of elastic suspension will occur to meteorological observers. Its principle is, of course, the same as the application of springs to the axles of carriages and railroad cars, or of rubber tires to the wheels of cabs and bicycles.

THE RELIABILITY OF THE RAIN GAUGE.

In the winter season observers frequently report that the wind has blown too severely during a snowstorm to allow of accurate measurement; by this we are to understand one of two things, either the snow has been drifted so much that the observer can not make a satisfactory estimate of its average depth over the country in his neighborhood, or else that he has observed the wind carrying the snow past his gauge to such an extent that he can not consider the amount caught in his gauge as a fair indication of what fell, or of what would have been caught if there had been no wind. This phenomenon of drift and this deficiency in the catch of the rain gauge are matters that trouble not only the measurement of snow but of rainfall on all occasions; the rain gauge is subject to a very appreciable error, which has always the nature of a deficit, and which increases with the strength of the wind and the fine-

ness of the rain. It seems a very simple matter to determine the quantity of rainfall by setting a simple cylinder or a pail or tub out in the open field and measuring the depth of water that falls therein. But if the gauge is in an open place fully exposed to every wind it will catch less rain than if it is artificially sheltered from the wind while standing in the same spot; if, on the other hand, the gauge is moved to a sheltered spot, it is liable to catch an erroneous rainfall, sometimes larger and sometimes smaller, depending on the location and heights of the buildings that shelter the spot. The true problem of the meteorological observer is to put his gauge in an open place, free from the influence of all buildings and trees, and yet determine the true rainfall at that spot free from the influence of the eddies produced by the wind at the mouth of his gauge. There is probably no error in the catch when it rains during a calm, but if the wind is blowing while the rain or snow is falling, then the gauge itself acts as an obstacle to the wind; the air that flows around it and above it, but close to it, moves faster than that a foot away from it; the snow flakes and finer particles of water that go into the gauge in one eddy come out on another. Some means must be devised to break up all eddies at the mouth of the gauge, or, failing that, we must have some method of applying a numerical correction.

Several instrumental methods have been adopted for preventing or diminishing the wind effect: *First*, about 1853, or earlier, Prof. Joseph Henry recommended to the Smithsonian observers a shielded gauge which is simply an ordinary cylindrical gauge having a horizontal, circular plate of tin 4 or 5 inches wide soldered to it an inch below the mouth of the gauge. By this means the disturbing eddies are kept principally beneath the flat rim, and, therefore, do no harm at the mouth of the gauge. *Second*, in 1878 Prof. Nipher, of St. Louis, described his form of shielded gauge in which the tin plate is replaced by an umbrelliform screen made of wire gauze; the gauze sufficiently breaks up the wind eddies while it greatly diminishes the spattering. Nipher's experiment showed that gauges at the height of 118 feet above the ground caught nearly the same as those at the ground. *Third*, in 1885 Boernstein devised a protected gauge, which is an ordinary gauge surrounded at a distance of a few feet by a separate fence or screen whose top may be a little above the top of the gauge; this protecting fence, therefore, diminishes the wind at the mouth of the gauge without introducing new and injurious eddies. Roofs of buildings are occasionally built slanting inwards instead of outwards, or sometimes the walls of the buildings rise several feet above the surface of the roof; in such cases a gauge placed near the center of the roof is protected against the violence of the wind and catches more than it would if raised a few feet higher above this protection. *Fourth*, the so-called pit gauge as first used in England; in this method a shallow pit is dug, from 3 to 6 feet in diameter, in the midst of an open field, and the gauge is set in the center so that its mouth shall be on a level with the surrounding field while the spatter is diminished in proportion to the depth of the pit.

As the wind increases rapidly with the elevation above the ground, therefore, gauges placed at great heights will catch less rain or snow than those at low elevations. The amount of this deficit is known quite accurately from many years of observations, a summary of which has been published by the

present editor in Bulletin No. 7, Forestry Division, U. S. Department of Agriculture, pp. 175-186, from which the following table is taken:

Group.	No. of stations.	Altitude.		Observed deficit.
		Meters.	Yards.	
1	4	0	0	0
2	4	1	1	10
3	4	2	2	12
4	4	3	3	14
5	4	4	4	15
6	4	5	5	15
7	4	6	7	16
8	7	13	14	21
9	7	28	31	36
10	5	59	65	42

In this table the pit gauge, at an altitude of 0, is adopted as the normal with which the gauges at other altitudes are to be compared. The table, for instance, shows that on the average of five stations at an average altitude of 59 meters, or 65 yards, the upper gauges caught only 58 per cent of that caught by the normal pit gauge, that is to say there was a deficit of 42 per cent of the normal rainfall. The deficits here given relate to the average snow and fine rain of winter and heavy rain of summer, and the average wind velocities at various European stations during several years. The deficits given in the fifth column are well represented by the expression: "Deficit equals 6 per cent of the square root of the altitude expressed in meters or yards;" but this 6 per cent is a factor that must vary with the character of the precipitation and the wind, being much greater in light rains and snows and much smaller in heavy rains.

If we establish two smaller gauges in an open field so that the mouth of the upper is twice as high as that of the lower, then the corrected rainfall will be found by adding to the catch of the lower gauge 2.414 times the excess of the catch of the lower gauge over and above the catch of the upper gauge. The value of any long series of rainfall measures will be greatly increased if the observer will establish near the present rain gauge another one of the normal styles known as the pit gauge, or the shielded gauge, or the protected gauge, or, failing that, if he will establish a second gauge similar to the one that has been long in use, but at twice its height above the ground or the roof. The comparison of the two records at the end of the year will give some idea of the irregularities to which the earlier records may be liable, and will show to what extent the records may be relied upon in discussing the question of a change of climate.

PREDICTION OF SEASONAL SNOW AND RAIN.

Mr. S. V. Rehart, of Lake View, Oreg. (N. 42° 05', W. 120° 20'; altitude about 5,000 feet), writes under date of February 5, 1894, as follows:

"Several years ago I observed a peculiar weather phenomenon which at the time I regarded as a mere coincidence entitled to no consideration, however, after having observed many repetitions of the same I believe that there are good grounds for the conclusion that said phenomenon is an indication and criterion that will enable us, months in advance, to predicate approximately the amount of precipitation that will be experienced during the winter season.

During the past twenty years on the Pacific coast the precipitation has been proportionate to the amount of heat during the previous summer; every winter of excessive precipitation was preceded by a long heated period during the summer, and every winter of light precipitation was preceded by a cool or cold summer as commonly understood. It is my opinion that all the precipitation on the Pacific coast originates over, and is governed by the Pacific Ocean; consequently, other regions would be governed by the same law. In describing some of the extreme seasons of the past, which the foregoing statements are based upon, having no data, I shall necessarily have to rely upon memory for the same, moreover the observations were made without the aid of instruments, in a high altitude, and over one hundred miles from the Pacific Ocean; however, I confidently believe that a critical examination will practically verify every statement herein made.

1874.—The summer of 1874 was an extremely cool summer, followed by light precipitation during the winter of 1874-'75.

1875.—The summer of 1875 was an extremely long, hot summer followed by excessive precipitation during the winter, corresponding in intensity and duration to the heated period of the previous summer.

1877.—Passing over one year brings us to the summer of 1877, when cool weather prevailed until July 10, when an excessively heated period began, continuing between five and six weeks, when unusually cool weather began and prevailed during the autumn months.

During the following winter all the early storms were only partially successful and only light precipitation prevailed until January 10, 1878, when excessive precipitation began, continuing between five and six weeks and

ending abruptly, after which exceptionally light precipitation prevailed during the spring months.

1878.—The summer of 1878 was another extremely cool summer followed by extremely light precipitation during the winter. This year remains vivid in my memory from the fact of a successful business venture made by myself, involving one-half of my capital stock; said venture being entered into upon the belief that light precipitation would be experienced during the winter of 1877-'78.

1889.—Passing over several years we come to the summer of 1889 which was a long, hot summer followed by excessive precipitation during the winter.

1890.—Cool weather prevailed during the greater part of the summer, the heated period being of short duration, and during the winter less than an average precipitation was experienced.

1891.—Cool weather prevailed all summer, excepting the month of August, when rather excessively hot weather prevailed during the month.

The following winter light precipitation prevailed, excepting the month of December, when successful storms were experienced during the whole of said month.

1892.—The summer of 1892 a long period of hot weather prevailed, although the heat was less intense than some preceding summers described.

During the winter the storms were all more or less successful, and precipitation considerably above the average was experienced.

1893.—The summer of 1893 had a heated period lasting about two months, beginning July 1 and ending September 3, when exceptionally cool weather began and continued during the autumn months (similar to the autumn of 1877).

While the heated period was longer than an average of summers, the heat was not excessive, excepting a short spell in the first and latter part of the heated period, consequently, there was less than an average amount of heat during the past summer, everything considered, and consequently, I have been expecting less than an average precipitation during the winter, and in all probability, exceptionally light precipitation during the latter part of the winter and early spring months."

NOTE.—The observations quoted by this observer as the basis for his generalizations seem to have been made at or near Lake View, on the southern-central border of Oregon. This station is at the northern end of Goose Lake, a body of fresh water about 30 miles long north and south and 10 miles wide, whose outlet at the southern end is the Pitt River, flowing into the Sacramento. This lake is, therefore, near the summit, but still on the western slope of the northern Rocky Mountain plateau region, and the precipitation at Lake View must result principally from the south and west winds that sweep up the lake and the valley of the Pitt River. As there is no Weather Bureau station of similar exposure in this neighborhood whose records can be appealed to to support Mr. Rehart's rule, the editor has examined the tables of temperature and precipitation at some stations in Oregon and Washington, given in the large mass of data that is summarized in the special report of the Chief Signal Officer, published as Senate Ex. Docs., Nos. 91 and 282, 50th Congress, 1st session, Washington, 1889.

The monthly temperatures and precipitations for 23 stations in Oregon between the years 1853-1886 were brought under examination; fragmentary years and very short series were omitted. The average temperature of the summer months during June, July, and August, and the total precipitation during the following winter months, December, January, and February, were computed. Each summer temperature and winter precipitation was marked A, N, or B, according as it was above the normal, normal, or below the normal; there were of temperatures 52 A, 83 N, 49 B, and of rainfalls 51 A, 89 N, 44 B, or in all 368 seasonal numbers. The series was then examined to see how many times the winter precipitations, A, N, or B, followed the summer temperatures, A, N, or B, respectively. When precipitation above the normal follows a temperature above the normal, that is to say, when, for any given summer we have the sequence AA, or *vice versa* the sequence BB, then such cases are favorable to the rule of Mr. Rehart; there were 15 of the first out of the 52 A, and 8 of the second out of the 49 B, or 23 altogether out of 101 cases. When we have the sequence AB or BA, we have cases decidedly opposed to Mr. Rehart's rule; there were 13 of the first out of the 52 A, and 17 of the second out of the 49 B, or 30 altogether out of 101 cases. The cases of normal temperature or precipitation were, of course, the most numerous and do not so seriously affect the working of this rule; they were as follows: A N, 24; B N, 24; N A, 19; N N, 41; N B, 23, or in all 131. Classified by years, the only year for which a relatively large number of stations gave results decidedly favorable to the rule was 1886, for which there were 5 favorable stations and 6 neutral. We must conclude, therefore, that this rule does not hold good for the whole Pacific coast, nor for the whole of Oregon, but only for some particular locality, if at all.

It is very desirable to investigate all plausible empirical rules in climatology, but it is, of course, absolutely necessary that such study should be based upon observations recorded at the time and made accessible by publication to those who desire to study the subject further. Possibly some modification of the rule here enunciated as to summer temperatures and winter rains may accord more nearly with the meteorological records.

METEOROLOGICAL TABLES.

[Prepared by the Records Division.]

Table I gives, for 140 Weather Bureau stations making two observations daily and for 10 others making only the 8 p. m. observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation.

The stations are arranged in geographical or climatological divisions, for each of which the mean temperature and average precipitation for the month are also given, together with their departures from normal values.

Generally the headings of the several columns are sufficiently explicit as to the data underneath.

The mean pressure is based on the 8 a. m. and 8 p. m. simultaneous observations. Mean values thus computed differ from the mean of the 24 hourly readings by amounts varying from zero to 0.02 of an inch; the departures east of the ninetyeth meridian are generally above the mean of 24 hourly readings and those west of that meridian are generally below. A comparison for each individual station can readily be made in connection with the data given in Table VI.

The pressures have been reduced to sea level by the empirical method published by Prof. H. A. Hazen in Signal Service Professional Paper No. VI, which, however, has been further modified for a few special stations.

The mean temperature of the dew point and the mean relative humidity are based on daily observations of the whirled psychrometer at 8 a. m. and 8 p. m.

The maximum wind velocities given in the table are the velocities as read from the sheets of the register for any 5-minute period in the 24 hours, midnight to midnight, seventy-fifth meridian time.

The number of clear and cloudy days and the average cloudiness are based upon numerous personal estimates by the observer during the daytime and do not relate especially to the nighttime after the 8 p. m. observation.

When these personal estimates give from 0 to 3 cloudiness, on a scale of zero to ten (0—10), the day is classed as clear; 4 to 7, partly cloudy; and 8 to 10, cloudy.

Table II gives, for about 2,200 stations occupied by voluntary observers, the extreme maximum and minimum temperatures, the mean temperature deduced from the average of all the daily maxima, and minima, or other readings, as indicated by the numeral following the name of station; and the total monthly precipitation.

For the sake of uniformity the monthly mean temperature has been deduced from readings of self-registering maximum and minimum thermometers whenever practicable. Formerly the means obtained by the use of observations at 7 a. m., 2 and 9 p. m. were printed in this table, whenever given, in preference to those deduced from the daily extremes.

These stations are arranged alphabetically by States, and their reports are generally received through the co-operation of the respective State Weather Services. The voluntary stations in the Republic of Mexico and those in the West Indies are included in this list for convenience of tabulation.

Table III gives, for about 30 Canadian stations, the mean pressure, mean temperature, total precipitation, prevailing wind, and the respective departures from normal values. Reports from Newfoundland and the Bermudas are included in this table for convenience of tabulation.

The mean pressures and temperatures here given are based

upon observations made simultaneously for telegraphic purposes at 8 a. m. and 8 p. m., seventy-fifth meridian time; the pressures have been reduced to sea level by the Weather Bureau method and, therefore, differ slightly from those reduced by the method employed by the Canadian Meteorological Service.

Table IV gives for 34 stations the percentages of hourly sunshine as derived from the automatic records made by two essentially different types of instruments, designated, respectively, as the thermometric recorder and the photographic recorder. The kind of instrument used at each station is indicated in the table by the letter T or P in the column following the name of the station.

The thermometric recorder operates on the principle of a Leslie differential air thermometer, one of the bulbs being blackened. It is fully described in the "American Meteorological Journal," Vol. ix, pp. 345-349. The record is produced electrically whenever the intensity of the sunshine surpasses a certain minimum limit and is sufficient to cause a mercurial column to rise above the upper of two platinum wires. The intensity of sunshine above this limit is not recorded. The instrument is adjusted by trial and observation so that a record will just be made when the cloudiness is not sufficient to quite obscure the disc of the sun. Denser cloudiness than this, so that the exact form of the sun's disc can not be seen with the unaided eye, will cause an interruption of the record.

The photographic recorder operates on the principle of Jordan's recorder. The record sheets for this instrument are sensitized each month with the ordinary blue-print solution, and are generally used only for a period of fifteen days, a new sheet being then introduced, but the instrument can be used for a whole month's record without changing the sheets.

Neither of these instruments will record satisfactorily the duration of the sunshine for about one hour after sunrise and one hour before sunset and, on this account, it has been considered necessary to apply to the recorded hours of sunshine what has been designated a "twilight correction." The amount of this correction is found from a table of the time of sunrise and sunset, noting, in connection therewith, the time of beginning and ending of sunshine on the automatic record. This correction is applied when we know, by personal observation, the comparative clearness of the sky at the time of sunrise or sunset, as the case may be.

Although the action of the thermometric recorder is based on the heating effect of the sun's rays, while that of the photographic recorder is based on the actinic effect, it is found there is not a very great difference between the two instruments. In general, however, the photographic recorder does not give such good results at stations where rain is more or less frequent and with comparatively high relative humidities, since under these conditions the sensitized paper deteriorates.

Although the original instruments are regulated by standard eastern time, yet the readings of the record sheets are adjusted to local mean time. The last column gives the percentage of sunshine deduced by taking the complement of the local observer's estimate of cloudiness, which latter is published in Table I.

Table V gives for 82 stations the mean hourly temperatures deduced from thermographs of the well-known pattern manufactured by Richard Bros., Paris, described and figured in the report of the Chief of the Weather Bureau, 1891-'92,

p. 29. These instruments are placed in the standard shelter with other thermometers, and are checked twice daily, for time errors and for agreement with the standard whirled thermometer.

In transcribing the hourly values, the readings of the dry-bulb thermometer of the whirled psychrometer at 8 a. m. and 8 p. m. are adopted as the standard of reference, and these standard readings are given in the appropriate columns of Table V. Corrections for intermediate hours, interpolated from the known differences at 8 a. m. and 8 p. m., are applied to the curve throughout the twenty-four hours, thus making it conform as closely as practicable to the indications of the standard mercurial thermometer. The averages given in this table are, therefore, those of the standard dry thermometer at 8 a. m. and 8 p. m., and the corrected thermograph reading for intermediate hours.

In general the magnitude of the corrections applied is about 1° Fahrenheit, although a number of instruments accord with the standard dry thermometer within less than a degree.

As has been noted elsewhere, the greatest differences are those between the daily extremes registered by thermographs and by standard self-registering maximum and minimum thermometers, respectively.

Table VI gives for 68 stations the mean hourly pressures (seventy-fifth meridian time) as automatically registered by barographs of the pattern manufactured by Richard Bros., Paris, except for Washington, D. C., where Foreman's barograph is in use. Both instruments are described in the Report of the Chief of the Weather Bureau for 1891-'92, pp. 26 and 30.

The readings of the mercurial barometer at 8 a. m. and 8 p. m., seventy-fifth meridian time, corrected for temperature and instrumental error, are used as a means of checking and correcting the barograph curve, in the same manner as described in the table of temperature means, and are those given in this table.

The corrections applied to the individual hourly barograph readings vary in magnitude. The average is about 0.02 of an inch, while in extreme cases it may be 0.06 or 0.08 of an inch, depending somewhat on the individual skill of the observer in keeping the instrument in adjustment.

The means have not been reduced to sea level, neither has a correction to reduce to standard gravity been applied.

Although the mean pressures are given in this table to the nearest thousandth of an inch, yet it is probable that these figures still need appreciable systematic corrections, therefore, as in the case of so many other similar European series, caution should be exercised in using them for the investigation of diurnal periodicities of pressure. The adopted process of reduction to the standard mercurial barometer prevents the accumulation of any progressive error, whether due to the time scale or to the vacuum box, but does not inform us of any periodic errors that may have occurred within the 12-hour periods. On this latter point we have only the little knowledge that is given to us by a general investigation into the effect of temperature on these aneroids. In this respect Prof. Marvin's experiments have shown that, although the manufacturer has introduced a compensation for temperature (presumably by introducing some air into the vacuum box), yet this result has not always been perfectly satisfactory. Several aneroids have been found to show higher pressures when the instrumental temperature rises, while others do the reverse. In a number of cases a rise of 10° F., in the instrumental temperature produces a fall of 0.010 or 0.015 of an inch in the recorded pressure.

In general, it is safe to assume that any one of the Richard barographs at Weather Bureau stations is liable to a temper-

ature correction of this amount, although the average of several instruments would undoubtedly be much smaller. Since the highest temperature, and, therefore, the largest plus or minus correction for temperature, generally occurs some time after the 8 a. m. reading, and *vice versa*, the lowest temperature with the largest minus or plus correction occurs before the 8 a. m. reading; therefore, there is introduced into every daily barograph record an error that will be either positive between 8 p. m. and 8 a. m., and negative between 8 a. m. and 8 p. m., or *vice versa*. The average amount of the maximum value of this error for a month, varying as it does with the temperature of the room in which the aneroid is kept, may easily amount in the winter season to 0.02 of an inch, but when station barometers are located in large buildings of uniform temperature the limit will diminish. It is evident, therefore, that these hourly means can not be used for determining by the harmonic analysis the shorter and smaller periodicities, although they sometimes give the semi-amplitude of the principal simple daily component to within 0.01 of an inch, or less. To this extent, therefore, these may be cautiously used in the study of both the geographical and chronological distribution of this first component, a study whose importance undoubtedly warrants the preparation and publication of this table from month to month. Some of the results of such studies will be published in subsequent numbers of this REVIEW.

Table VII gives for 142 stations the arithmetical means of the hourly movements of the wind ending with the respective hours, as registered automatically by the Robinson anemometer, in conjunction with an electrical recording mechanism, described and illustrated in the Report of the Chief of the Weather Bureau, 1891-'92, p. 19. No corrections have been applied to reduce the registered velocities to true velocities.

In studying the diurnal variations of wind movement, the following facts should be kept in mind. In graduating the dials of the various sizes of Robinson anemometers, it has been assumed by the makers that the centers of the cups move only one-third as fast as the wind, although numerous experiments have demonstrated that cups and arms of various proportions require different formulæ and tables of reduction even in perfectly steady motion. Prof. Marvin has further shown that for ordinary gusty winds, when the anemometer cups rapidly vary their rate of rotation, the moment of inertia of the revolving parts is a most important factor. The instruments having the least inertia record most truly, and those having large inertia exceed these in proportion as the gusts are stronger, consequently, the anemometer records are liable to be too large in the gusty winds of the daytime as compared with the more steady winds of nighttime. No correction for this inertia error has been determined, nor can be, unless we have simultaneous records with two anemometers having different moments of inertia; therefore, the apparent diurnal variations of wind velocity include a slight inertia error which is probably periodic in character between the winds of daytime and nighttime.

While we must regard the gustiness of the ordinary wind, that is, its sudden and momentary fluctuations of velocity, as highly variable, yet in practical anemometry we can not do more than make an average allowance for its effects upon an anemometer.

For the ordinary gusty winds of the free atmosphere Prof. Marvin adopts the following equation expressing the relation between the motion of the cups and the velocity of the wind at any moment:

$$\text{Log. } V = 0.509 + 0.9012 \log. v;$$

where V is velocity of wind in miles per hour and v is the linear velocity (also in miles per hour) of the cup centers.

This equation applies strictly to anemometers that have 4-inch hemispherical brass cups on arms 6.72 inches long, whose revolving parts weigh about 590 grams (22 ounces) and have a moment of inertia of about 50,000 C. G. S. units.

This equation has been deduced from comparative observations in the open air of anemometers whose behavior in steady velocities on the whirling machine had been previously studied. The recognition thus given the important effects of inertia enables us to say that by applying this formula, or the following equivalent table, we partly annul the influence of the inertia of brass anemometers used by the Weather Bureau.

The following table gives the corrected velocities corresponding to observed velocities up to 90 miles per hour:

Wind velocities, as indicated by Weather Bureau anemometer, converted to true velocities (in miles per hour).

Indicated velocity.	0	1	2	3	4	5	6	7	8	9
0.....	9.6	10.4	11.3	12.1	12.9	13.8	14.6	15.4	16.2	17.0
10.....	17.8	18.6	19.4	20.2	21.0	21.8	22.6	23.4	24.2	24.9
20.....	25.7	26.5	27.3	28.0	28.8	29.6	30.3	31.1	31.8	32.6
30.....	33.3	34.1	34.8	35.6	36.3	37.1	37.8	38.5	39.3	40.0
40.....	40.8	41.5	42.2	43.0	43.7	44.4	45.1	45.9	46.6	47.3
50.....	48.0	48.7	49.4	50.2	50.9	51.6	52.3	53.0	53.8	54.5
60.....	55.2	55.9	56.6	57.3	58.0	58.7	59.4	60.1	60.8	61.5
70.....	62.2	62.9	63.6	64.3	65.0	65.8	66.4	67.1	67.8	68.5
80.....	69.2	69.9	70.6	71.3	72.0	72.7	73.4	74.1	74.8	75.5
90.....	76.2	76.9	77.6	78.3	79.0	79.7	80.4	81.1	81.8	82.5

Table VIII gives the resultant movements of the winds for 67 stations of self-registration as deduced from the continuous record for every hour of the month. The contents of the columns are as follows:

Column 1—the name and number of the station, the latter being the same as in tables I and IX for convenience of reference. Columns 2 and 3—the direction and duration of the prevailing wind, viz, that observed most frequently. Columns 4 and 5—the total movement in all directions for the whole month and the average hourly movement corre-

sponding thereto. Column 6—the resultant direction, assuming the wind to have always a uniform velocity. Column 7—the duration in hours of this resultant direction, considered as a wind that has blown with the average velocity. Column 8—the approximate average hourly velocity in this resultant direction, found by dividing the resultant movement of column 10 by the resultant duration of column 7. Column 9—the direction of the resultant movement, computed by using the miles actually traveled each hour, as read from the registers. Column 10—the amount of the resultant movement in miles. Column 11—the azimuth of the resultant movement minus the azimuth of the resultant direction; these azimuths are counted around the circle from zero at the south through 90° at the west, and if the azimuth of the resultant movement is greater than that of the resultant direction, the difference in column 11 is called positive; the azimuth of the movement is equal to that of the direction plus the positive, or minus the negative differences. Column 12—the ratio of the resultant movement in column 10 divided by the total movement in column 4; this ratio would be unity in the ideal case of wind blowing from one direction only, but would be zero in the ideal case of equal opposing winds.

Table IX gives for 140 stations, or all that make observations at 8 a. m. and 8 p. m. (seventy-fifth meridian time), the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind in miles. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in each geographical division one may obtain the average resultant direction for that region. From these resultant directions one may pass to the resultant movement, at least approximately, by applying the average corrections indicated by column 11 of Table VIII.

TABLE I.—Climatological data for Weather Bureau Stations, January, 1894.

TABLE I.—Climatological data for Weather Bureau Stations, January, 1901.																																	
Districts and stations.	Elevation above sea-level, feet.	Length of record, years.	Pressure, in inches.		Temperature of the air, in degrees Fahrenheit.					Humidity and precipitation.					Wind.				Mean temperature data since opening of station.														
			Mean pressure, 8 a. m. and 8 p. m. + 2.	Mean reduced.	Departure from normal.	Mean max. and min. + 2.	Departure from normal.	Maximum.	Date.	Mean minimum.	Date.	Mean range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal.	Days with or more.	Total movement, miles.	Prevailing direction.	Maximum velocity.		Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Highest for month.	Year.	Lowest for month.	Year.				
																				Miles per hour.	Direction.												
New England.																																	
Eastport.....	76	21	29.99	30.09	+ .09	21.2	+ 2.4	51	25	29	—	10	14	38	13	70	2.00	—	13	10,828	nw.	78	ne.	30	7	12	6.1	28.0	1889	13.1	1875		
Portland.....	103	23	29.99	30.10	+ .05	22.2	+ 2.1	46	24	30	—	10	14	28	13	72	3.13	—	12	5,883	n.	38	nw.	30	14	3	14	5.9	32.3	1889	5.7	1893	
Northfield.....	872	7	29.16	30.16	+ .09	17.6	+ 2.8	51	24	30	—	10	14	28	12	80	2.50	—	13	7,131	n.	42	n.	30	5	12	14	6.3	32.7	1889	20.0	1888	
Boston.....	125	24	30.00	30.14	+ .07	30.1	+ 4.7	56	24	37	—	10	14	22	28	80	3.01	—	12	9,126	w.	51	ne.	29	9	13	15	6.3	35.8	1889	23.8	1893	
Nantucket.....	14	8	30.11	30.12	+ .06	33.2	+ 2.5	50	24	38	—	10	14	20	28	80	3.14	—	13	10,051	n.	58	se.	29	9	17	15	6.4	38.8	1889	21.6	1893	
Woods Hole.....	17	8	30.11	30.12	+ .06	32.8	+ 1.5	53	24	38	—	10	14	20	28	80	3.14	—	13	11,877	nw.	58	nw.	30	10	4	17	6.4	38.8	1889	21.6	1893	
Vineyard Haven.....	8	8	30.11	30.12	+ .06	32.8	+ 1.5	53	24	38	—	10	14	20	28	80	3.14	—	13	11,877	nw.	58	nw.	30	10	4	17	6.4	38.8	1889	21.6	1893	
Block Island.....	27	14	30.12	30.15	+ .06	33.6	+ 2.4	54	24	38	—	10	14	22	28	80	3.14	—	13	13,549	nw.	68	e.	29	7	14	10	5.8	37.0	1890	23.7	1893	
Narragansett Pier.....	12	12	30.12	30.15	+ .06	33.6	+ 2.4	54	24	38	—	10	14	22	28	80	3.14	—	13	13,549	nw.	68	e.	29	7	14	10	5.8	37.0	1890	23.7	1893	
New Haven.....	107	22	30.03	30.15	+ .07	30.5	+ 3.5	51	24	37	—	10	14	25	23	75	2.74	—	13	6,671	ne.	35	ne.	29	12	6	13	5.5	37.5	1889	19.8	1893	
New London.....	45	23	30.12	30.17	+ .03	31.4	+ 1.9	52	24	38	—	10	14	25	23	75	2.74	—	13	6,671	ne.	35	ne.	29	12	6	13	5.5	37.5	1889	20.8	1893	
Mid. Atlantic States.																																	
Albany.....	85	21	30.08	30.18	+ .08	26.6	+ 2.4	50	24	31	—	13	19	30	22	83	2.54	—	17	6,159	sw.	36	se.	18	7	9	15	6.5	31.0	1889	14.5	1875	
New York, N. Y.....	185	24	29.96	30.17	+ .05	34.6	+ 3.7	58	24	40	—	15	26	27	22	78	2.70	—	17	8,004	nw.	43	nw.	30	8	14	9	5.9	40.2	1890	23.3	1893	
Harrisburg.....	377	6	29.77	30.20	+ .03	33.4	+ 2.8	54	24	40	—	15	26	27	22	78	2.70	—	17	8,004	nw.	43	nw.	30	8	14	9	5.9	40.2	1890	23.3	1893	
Philadelphia.....	117	24	30.05	30.18	+ .04	30.6	+ 4.5	58	24	42	—	19	26	32	22	86	1.78	—	14	7,651	nw.	38	nw.	12	9	6	16	6.2	41.8	1890	24.0	1893	
Atlantic City.....	53	21	30.13	30.17	+ .04	37.4	+ 5.1	54	24	43	—	19	26	32	22	86	2.07	—	17	8,715	nw.	52	w.	30	6	7	18	7.0	42.1	1890	22.9	1893	
New Brunswick.....	179	24	29.98	30.19	+ .03	32.2	+ 3.2	57	24	43	—	18	26	32	22	86	1.46	—	17	5,413	nw.	48	w.	30	12	13	6	5.2	44.0	1890	24.6	1893	
Baltimore.....	112	24	30.08	30.20	+ .03	37.8	+ 5.2	58	24	43	—	18	26	32	22	86	1.46	—	17	5,413	nw.	48	w.	30	12	13	6	5.2	44.0	1890	24.6	1893	
Washington, D. C.....	112	24	30.08	30.20	+ .03	37.8	+ 5.2	58	24	43	—	18	26	32	22	86	1.46	—	17	5,413	nw.	48	w.	30	12	13	6	5.2	44.0	1890	24.6	1893	
Cape Henry.....	685	23	29.46	30.22	+ .05	41.2	+ 4.3	65	24	50	—	29	31	38	26	38	3.52	—	11	3,136	sw.	30	nw.	11	10	11	5	5.8	47.2	1890	26.6	1893	
Lynchburg.....	57	24	30.13	30.20	+ .04	44.1	+ 3.9	68	24	50	—	29	31	38	26	38	3.54	—	12	5,839	ne.	41	nw.	12	9	10	12	5.7	51.2	1890	30.4	1893	
Norfolk.....	57	24	30.13	30.20	+ .04	44.1	+ 3.9	68	24	50	—	29	31	38	26	38	3.54	—	12	5,839	ne.	41	nw.	12	9	10	12	5.7	51.2	1890	30.4	1893	
S. Atlantic States.																																	
Charlotte.....	773	16	29.36	30.21	+ .03	44.7	+ 3.3	64	16	52	—	24	26	37	27	34	3.23	—	12	5,265	sw.	24	sw.	30	6	9	16	6.5	50.8	1890	32.6	1893	
Hatteras.....	11	14	30.18	30.19	+ .03	48.7	+ 3.1	65	6	53	—	30	38	44	22	40	4.45	—	13	11,594	n.	52	n.	25	8	15	6	6.3	55.7	1890	32.1	1893	
Kittyhawk.....	9	19	30.16	30.17	+ .03	46.0	+ 3.8	68	24	51	—	25	29	36	29	36	4.60	—	12	4,781	n.	25	nw.	12	8	8	15	6.2	51.6	1890	30.8	1893	
Raleigh.....	388	8	29.79	30.22	+ .04	43.6	+ 2.1	60	11	56	—	31	26	42	24	44	4.31	—	10	7,523	ne.	29	w.	30	7	13	11	5.5	57.2	1890	38.9	1893	
Southport.....	34	19	30.16	30.19	+ .02	48.8	+ 2.2	60	11	56	—	31	26	42	24	44	4.31	—	10	7,523	ne.	29	w.	30	7	13	11	5.5	57.2	1890	38.9	1893	
Wilmington.....	78	24	30.12	30.22	+ .05	49.6	+ 2.3	75	6	60	—	30	27	46	23	45	82	1.71	—	2	6,218	n.	29	sw.	11	8	15	8	5.8	59.3	1890	42.8	1889
Charleston.....	52	24	30.17	30.22	+ .04	52.8	+ 2.9	74	6	68	—	27	27	40	28	45	82	1.73	—	2	6,218	n.	29	sw.	11	8	15	8	5.8	59.3	1890	42.8	1889
Columbia.....	7	7	30.02	30.25	+ .05	49.2	+ 2.8	74	6	58	—	26	27	41	34	41	78	1.68	—	2	4,562	n.	24	sw.	7	12	6	13	5.4	56.8	1890	44.3	1893
Augusta.....	200	23	30.02	30.25	+ .05	49.7	+ 2.3	73	6	58	—	26	27	41	34	41	78	1.68	—	2	4,562	n.	24	sw.	7	12	6	13	5.4	56.8	1890	44.3	1893
Savannah.....	98	24	30.11	30.22	+ .03	54.0	+ 2.4	78	5	62	—	32	27	46	29	45	82	2.29	—	1	4,651	n.	27	w.	29	6	8	17	6.7	63.4	1890	49.2	1893
Jacksonville.....	43	23	30.16	30.21	+ .03	58.6	+ 2.8	79	11	67	—	36	27	50	31	50	84	2.29	—	1	4,651	n.	27	w.	29	6	8	17	6.7	63.4	1890	49.2	1893
Florida Peninsula.																																	
Jupiter.....	28	7	30.14	30.18	68.0	+ 1.0	82	29	74	—	49	31	62	22	61	83	2.55	—	1	6,993	e.	28	ne.	18	7	9	5	4.0	72.2	1890	60.0	1893
Key West.....	24	24	30.15	30.17	+ .03	71.0	+ 0.6	80	6	75	—	61	3	67	13	63	80	1.21	—	9	7,707	n.	33	ne.	19	8	16	7	5.7	74.9	1875	63.8	1886
Tampa.....	36	24	30.16	30.20	63.6	+ 2.1	81	7	71	—	40	31	54	31	56	84	1.42	—	4	3,977	n.	27	sw.	29	5	24	2	5.3
Titusville.....	44	7	30.16	30.20	63.2	+ 1.7	81	7	71	—	40	31	54	31	56	84	1.42	—	4	3,977	n.	27	sw.	29	5	24	2	5.3
Eastern Gulf States.																																	
Atlanta.....	1,131	16	29.01	30.24	+ .03	46.7	+ 3.2	66	5	54	—	18	25	39	27	38	77	5.09	—	1	7,614	e.	40	nw.	29	10	7	14	6.1	54.1	1889	35.7	1884
Pensacola.....	56	15	30.11	30.17	+ .02	56.8	+ 3.9	75	7	65	—	24	26	46	30	49	80	2.92	—	10	6,787	n.	35	se.	20	12	6	13	5.3	62.8	1890	49.3	1884
Mobile.....	57	24	30.12	30.19	+ .00	55.3	+ 4.4	77	7	65	—	24	26	46	30	49	80	2.92	—	10	6,787	n.	35	se.	20	12	6	13	5.3	62.8	1890	49.3	1884
Montgomery.....	257	22	29.92	30.20	+ .00	52.1	+ 3.9	78	6	62	—	21	25	43	37	42	83	2.58	—	2	4,970	e.	30	nw.	24	10	9	12	5.6	57.6	1889	40.5	1884
Meridian.....	359	22	29.78	30.18	49.4	+ 2.8	74	6	60	—	16	25	39	37	42	83	4.70	—	12	4,970	e.	25	w.	20	14	8	9	4.0
Vicksburg.....	254	23	29.87	30.15	+ .04	53.0	+ 7.7	76	18	63	—	16	25	39	37	41																	

TABLE I.—Climatological data for Weather Bureau Stations, January, 1894—Continued.

Districts and stations.	Elevation above sea-level, feet.	Length of record, years.	Pressure, in inches.		Temperature of the air, in degrees Fahrenheit.						Humidity and precipitation.						Wind.				Mean temperature data since opening of station.											
			Mean pressure, 8 a. m. and 8 p. m. + 2.	Mean reduced.	Departure from normal.	Mean max. and min. + 2.	Departure from normal.	Maximum.	Date.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal.	Days with .01 or more.	Total movement, miles.	Prevailing direction.	Maximum velocity.		Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Highest for month.	Year.	Lowest for month.	Year.		
																					Miles per hour.	Direction.									Date	
Up. Miss. Val.—Con.																																
Davenport.....	613	23	29.42	30.12	-.03	24.2	+5.1	62	17	31	-21	25	17	29	18	77	1.33	-.04	9	7,082	W.	40	W.	11	12	11	8	5.3	37.6	1880	9.1	1888
Des Moines.....	869	16	29.14	30.14	-.04	21.0	+4.3	55	1	30	-27	25	12	41	14	78	1.09	-.03	6	5,986	NW.	32	W.	19	14	7	10	5.3	36.2	1880	6.9	1888
Dubuque.....	651	21	29.36	30.11	-.02	21.8	+5.3	60	17	30	-22	25	14	34	15	77	1.11	-.06	6	4,138	S.	24	W.	11	10	9	12	5.6	34.2	1880	6.6	*
Keokuk.....	613	23	29.42	30.12	-.03	28.0	+7.0	68	17	35	-16	24	20	41	20	74	2.24	+.06	7	6,013	N.	35	W.	11	14	6	9	4.3	31.3	1880	13.6	1888
Cairo.....	359	23	29.75	30.15	-.02	40.0	+7.0	68	17	48	-4	25	32	29	32	77	2.18	+.01	11	6,988	S.	36	S.	20	14	6	11	5.1	31.3	1880	25.4	1886
Springfield, Ill.....	544	15	29.41	30.13	-.04	29.4	+3.8	66	17	37	-17	25	22	36	23	77	2.51	+.01	9	7,324	S.	35	S.	17	11	7	13	5.6	43.7	1880	16.8	1893
Hannibal.....	534	...	29.52	30.12	...	30.6	...	71	17	39	-14	24	21	40	22	73	2.29	...	6	6,830	S.	29	W.	11	13	8	10	4.9	...	...	...	...
Saint Louis.....	571	24	29.50	30.13	-.03	25.5	+6.8	72	17	43	-11	24	28	35	25	68	1.16	+.02	6	8,788	S.	40	W.	17	20	5	6	3.2	45.7	1880	21.7	1881
Missouri Valley.																																
Columbia.....	...	...	29.05	30.14	-.06	32.5	...	74	17	44	-16	25	21	40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kansas City.....	963	6	29.05	30.14	-.06	29.6	+3.8	67	16	38	-15	24	21	35	21	72	1.67	+.05	5	7,943	S.	35	NW.	11	14	7	10	5.2	34.0	1891	22.0	1893
Springfield, Mo.....	1,350	9	28.63	30.12	-.05	35.6	+5.7	70	17	45	-17	24	26	33	25	73	2.88	+.06	5	7,307	SE.	30	SE.	20	8	14	9	5.0	39.4	1890	27.5	1888
Topeka.....	2,013	7	28.63	30.12	-.05	29.8	+4.5	70	16	41	-14	24	19	41	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Omaha.....	1,123	24	28.88	30.16	-.06	26.6	+3.4	61	16	30	-22	24	12	40	14	80	0.51	+.02	7	5,587	NW.	26	NW.	23	13	4	14	5.5	34.5	1880	7.3	1886
Valentine.....	2,013	8	27.24	30.16	-.06	16.5	+2.1	53	15	27	-38	24	6	42	8	77	1.09	+.06	9	6,451	NW.	48	NW.	28	13	10	8	5.2	28.0	1891	7.1	1886
Sioux City.....	1,165	...	28.81	30.15	...	14.6	...	52	16	24	-26	24	6	34	9	84	0.60	...	6	7,474	NW.	36	NW.	11	12	10	9	4.5	...	...	...	...
Pierre.....	1,470	...	28.64	30.16	...	16.8	...	47	13	20	-28	24	2	47	6	84	0.46	...	10	5,168	SE.	32	NW.	10	7	14	10	5.5	...	...	...	...
Huron.....	1,310	13	28.64	30.18	-.03	3.9	+1.1	42	10	14	-35	24	4	56	1	88	0.71	+.03	9	8,308	NW.	37	NW.	21	9	12	10	5.4	24.1	1891	1.4	1888
Yankton.....	1,232	21	28.73	30.16	-.04	12.6	+1.2	50	13	22	-26	24	4	38	6	77	0.57	0.0	7	5,473	NW.	35	NW.	10	9	11	11	5.6	28.9	1886	0.5	1875
Northern Slope.																																
Hayre.....	2,477	14	27.27	30.07	-.08	11.2	+5.9	54	13	21	-26	23	2	59	6	79	0.99	0.0	13	8,034	SW.	50	SW.	13	5	17	9	6.2	26.6	1891	5.1	1890
Miles City.....	2,374	17	27.43	30.13	...	9.2	+1.4	46	15	18	-30	24	0	45	6	90	0.73	+.02	12	3,175	SW.	43	W.	10	8	13	10	5.7	25.0	1891	2.0	1888
Helena.....	4,118	14	25.07	30.09	-.03	18.7	+3.4	52	13	26	-26	23	11	35	11	71	1.64	+.03	15	4,840	SW.	35	W.	10	9	7	15	5.7	27.5	1891	5.3	1888
Rapid City.....	3,280	9	26.54	30.12	-.06	18.5	+0.7	59	16	29	-26	24	8	40	9	71	0.41	+.01	11	5,761	W.	42	N.	26	9	11	11	5.8	31.8	1891	10.7	1885
Cheyenne.....	6,105	23	23.85	30.15	-.04	25.4	+1.6	59	15	36	-17	24	15	50	11	56	0.20	+.01	3	10,768	NW.	44	W.	10	17	13	1	3.3	31.8	1893	13.2	1875
Lander.....	5,377	...	24.50	30.17	...	17.7	...	53	15	32	-23	6	3	43	7	67	0.49	...	4	3,014	SW.	40	SW.	16	21	10	0	2.8	...	...	...	...
Kearney.....	2,206	...	27.70	30.17	...	21.0	...	58	16	32	-26	24	10	36	10	70	0.81	...	6	8,993	NW.	48	NW.	28	14	8	9	4.5	...	...	...	...
North Platte.....	2,841	20	27.05	30.19	-.03	29.4	+3.9	55	15	32	-26	24	9	39	10	73	0.33	+.02	5	6,050	W.	37	NW.	28	10	18	3	4.5	32.1	1880	7.7	1875
Middle Slope.																																
Colorado Springs.....	6,098	16	23.80	30.10	...	28.3	+2.6	65	15	42	-10	6	15	43	7	45	0.03	+.02	2	8,354	N.	73	NW.	20	15	15	1	3.4	34.9	1893	19.1	1875
Denver.....	5,287	23	24.03	30.11	-.08	31.4	+2.6	66	15	44	-7	23	18	42	10	42	0.18	+.04	3	6,632	S.	40	NW.	20	10	18	3	4.4	38.3	1893	16.8	1875
Pikes Peak.....	14,095	...	17.45	...	...	0.6	...	23	15	5	-7	6	16	52	6	77	0.00	...	3	24,252	NW.	102	W.	20	14	7	10	4.7	6.6	1893	1.9	1883
Pueblo.....	4,734	6	28.58	30.08	...	31.7	...	70	15	47	-7	6	16	52	6	77	0.00	...	3	6,813	NW.	44	NW.	20	13	16	2	4.0	36.6	1893	23.8	1891
Concordia.....	1,410	9	28.58	30.16	-.06	27.1	+5.7	72	16	35	-17	24	16	43	16	74	0.18	+.08	4	5,328	N.	28	N.	28	10	10	3	3.2	31.6	1891	10.5	1886
Dodge City.....	2,523	20	27.38	30.14	-.06	30.5	+7.2	68	15	45	-12	24	17	45	14	71	0.04	+.04	1	7,087	SE.	39	N.	23	17	8	6	3.6	38.1	1890	13.2	1875
Wichita.....	1,366	6	28.61	30.14	...	32.1	...	72	16	43	-8	24	22	35	20	60	0.78	...	3	7,062	S.	37	N.	23	17	8	6	3.7	33.6	1891	29.1	1892
Oklahoma City.....	1,239	...	28.77	30.15	...	36.8	...	76	16	48	-8	24	26	35	25	70	3.74	...	6	7,071	N.	45	N.	23	20	6	5	3.6	...	...	...	...
Southern Slope.																																
Abilene.....	1,748	9	28.26	30.15	-.05	45.2	+4.7	78	17	56	-4	24	34	34	29	61	1.24	+.03	5	7,319	SW.	48	NW.	20	17	8	6	3.1	49.8	1890	34.9	1886
Amarillo.....	3,691	...	26.22	30.11	...	36.2	...	72	16	48	-4	24	25	39	17	53	0.02	...	1	13,041	S.	50	W.	5	15	11	5	4.0	...	...	...	...
Southern Plateau.																																
El Paso.....	3,766	16	26.24	30.19	+.02	43.0	...	71	16	56	-14	8	30	41	13	36	0.33	+.02	2	7,153	NW.	48	W.	3	20	7	4	2.9	53.2	1879	39.9	*
Santa Fe.....	7,051	22	23.19	30.16	-.01	27.8	0.0	51	15	37	-3	7	19	30	7	42	0.23	+.03	3	5,268	NW.	32	NW.	19	21	7	3	2.9	33.6	1893	22.1	1878
Tucson.....	2,432	11	27.55	30.14	...	45.2	...	75	30	61	-18	20	36	47	22	49	0.11	+.07	2	4,996	NW.	34	SW.	4	21	6	4	3.4	51.3	1893	45.2	1894
Yuma.....	141	19	29.09	30.11	+.03	51.7	+2.2	74	29	68	-28	20	38	37	31	49	0.00	+.04	0	5,614	N.	38	W.	4	24	6	1	1.9	60.3	1877	50.2	1882
Keeler.....	3,622	9	26.35	30.15	+.01	38.0	...	64	29	48	-15	6	28	29	17	42	0.00	...	0	4,084	E.	36	SE.	15	24	6	1	2.3	43.1	*	35.3	1888
Middle Plateau.																																
Carson City.....	4,720	7	25.30	30.19	...	33.7																										

TABLE II.—Meteorological record of voluntary and other co-operating observers, January, 1894.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Alabama.					Arizona—Cont'd.				
Alico.....	79	24	54.1	.....	Yuma.....	78	32	51.0	0.00
Bermuda * f.....	77	31	51.8	1.77	Arkansas.				
Birmingham f.....	70 ¹	13 ⁴	50.4 ³	8.49	Arkadelphia.....	.....	.....	.....	2.78
Brewton * f.....	77	32	55.0	2.40	Arkansas City f.....	.....	.....	.....	6.87
Carrollton * f.....	68	12	48.6	7.71	Ashdown f.....	75	7	46.0	3.34
Chepultepec f.....	69 ⁴	8 ⁴	44.2 ³	5.63	Bee Branch f.....	77	0	45.6	2.02
Citronelle f.....	74	23	53.2	2.31	Blanchard Springs f.....	73	12	48.4	6.40
Claborne Landing f.....	.....	.....	.....	1.96	Brinkley f.....	65	5	42.4	4.80
Cordova.....	.....	.....	.....	5.48	Camden a f.....	.....	.....	.....	4.19
Demopolis f.....	.....	.....	.....	3.80	Conway * f.....	69	1	43.1	1.48
Eufaula a f.....	77	32	54.8	4.50	Corning f.....	70	—3	38.4	2.19
Eufaula f.....	.....	.....	.....	4.25	Dardanelle f.....	.....	.....	.....	2.45
Florence a f.....	.....	.....	.....	6.10	Fayetteville f.....	75	—17	40.0	3.50
Florence b f.....	67	3	45.6	6.18	Fulton f.....	.....	.....	.....	2.51
Fort Deposit * f.....	72	20	50.0	0.60	Gaines Landing f.....	.....	.....	.....	7.44
Gadsden f.....	73	15	49.0	5.83	Hamburg.....	75	10	47.8	8.58
Geneva f.....	82	28	55.2	0.14	Helena a f.....	.....	.....	.....	4.84
Greensboro f.....	72	13	49.0	4.91	Hot Springs.....	76	—1	44.8	3.51
Healing Springs f.....	81	10	49.9	3.34	Keesee Ferry f.....	76	—13	39.3	1.84
Highland Home f.....	76	21	52.4	1.92	Kirby f.....	74	2	45.0	3.10
Livingston b f.....	.....	.....	.....	3.48	Lonoke * f.....	68	3	40.7	2.19
Lock No. 4.....	.....	.....	.....	7.89	Mount Nebo f.....	66	—4	40.4	2.42
Lynn a f.....	.....	.....	.....	4.88	New Gascony * f.....	67 ^h	4 ^f	43.4	4.83
Maple Grove.....	76	12	50.2	6.22	Newport a f.....	.....	.....	.....	2.37
Marion f.....	.....	.....	.....	3.60	Newport e f.....	70 ^o	—2	41.6	1.09
Mount Willing f.....	78	22	54.1	2.38	Ocala f.....	72	1	43.6	4.08
Newbern f.....	73	15	48.8	4.22	Ozark f.....	72	—3	44.0	1.77
Newburg f.....	72	3	46.5	5.63	Rison f.....	72	6	46.6	4.85
Newton f.....	75	28	53.8	9.38	Rogers f.....	75	—22	34.8	4.20
Oxanna * f.....	60	17	47.3	7.73	Russellville f.....	72	0	43.6	2.60
Pine Apple f.....	79	20	50.6	1.74	Searcy f.....	70	—2	40.6	3.91
Pushmataha f.....	73	18	51.0	4.82	Stuttgart f.....	69	6	45.2	4.59
Rock Mills f.....	.....	.....	.....	4.03	Texarkana f.....	75	10 ¹	49.3	0.25
Scottsboro f.....	67	10	45.8	5.89	Washington b f.....	72	7	46.0	3.42
Selma a f.....	.....	.....	.....	3.67	Winslow * f.....	62	—15	34.0	2.34
Starlington * f.....	70	22	50.3	1.83	California.				
Sturdevant f.....	.....	.....	.....	0.86	Agnew.....	68	29	48.6	3.51
Talladega a f.....	.....	.....	.....	7.37	Anaheim * f.....	76	35	49.4	0.68
Talladega b f.....	69	14	47.2	7.78	Anderson * f.....	55	21	37.7	7.12
Talladega Falls f.....	.....	.....	.....	3.23	Antioch * f.....	61	30	45.5	4.29
Tuscaloosa f.....	71	12	46.4	8.57	Aptos * f.....	60	18	45.6	7.56
Union Springs a f.....	76	23	49.8	3.23	Arcata f.....	59	25	45.1	12.35
Uniontown.....	78	17	52.1	3.29	Arlington Heights.....	70	25	48.5	0.60
Valley Head f.....	68	12	44.1	4.57	Athlone * f.....	60	26	45.6	2.55
Warrior f.....	.....	.....	.....	7.15	Auburn * f.....	75	25	46.5	6.06
Wetumpka.....	.....	.....	.....	3.15	Bakersfield a * f.....	65	28	45.8	0.91
Wilsonville f.....	.....	.....	.....	5.99	Ballast Point L. H.....	.....	.....	.....	0.40
Alaska.					Barstow f.....	68	17	42.5	0.02
Killisnoo f.....	40	—2	20.8	5.85	Beaumont * f.....	70	27	48.0	0.30
Metlakatla f.....	44	12	29.2	7.48	Belmont * f.....	65	34	48.8	.....
Arizona.					Berendo * f.....	68	27	45.5	1.79
Antelope Valley f.....	.....	.....	.....	0.15	Berkeley.....	59	31	46.0	9.54
Arizona f.....	72	20	45.3	0.21	Bethany * f.....	68	34	47.4	4.22
Aria Canal Co. Dam.....	70	32	51.1	0.13	Bishop Creek * f.....	67	8	36.5	0.30
Benson * f.....	78	25	52.9	T.	Boca * f.....	65	—22	26.5	5.10
Bisbee * f.....	63	18	42.0	0.61	Borden * f.....	70	24	46.1	0.00
Buckeye f.....	83	20	51.4	T.	Boulder Creek * f.....	74	26	51.7	14.92
Calabasas f.....	69	16	42.1	0.60	Brentwood * f.....	58	27	44.1	5.04
Casa Grande * f.....	70	34	51.9	0.00	Brighton * f.....	70	24	48.8	2.45
Chiricahua M't's f.....	.....	.....	.....	1.60	Byron * f.....	56	26	42.4	3.99
Dragon f.....	.....	.....	.....	0.43	Caliente * f.....	65	29	45.6	3.30
Dragon Summit * f.....	72	26	50.2	0.43	Calistoga * f.....	69	24	49.2	15.28
Dudleyville f.....	73	23	44.8	0.62	Campo Seco.....	.....	.....	.....	5.89
Eagle Pass * f.....	.....	.....	.....	0.10	C. Mendocino L. H.....	.....	.....	.....	19.31
Farleys Camp.....	64	26	44.1	0.15	Capitola * f.....	68	24	48.9	.....
Flagstaff f.....	54	—19	24.4	2.00	Castroville * f.....	68	20	49.2	4.95
Florence f.....	75	26	48.5	0.39	Centerville * f.....	63	34	49.6	7.28
Fort Apache.....	61	—12	32.8	1.24	Chico * f.....	64	24	44.8	7.19
Fort Bowie f.....	66	17	42.2	0.65	Chino * f.....	68	24	44.3	1.10
Fort Grant.....	69	18	41.3	0.38	Cisco * f.....	39	—5	23.9	.....
Fort Huachuca.....	67	14	41.4	0.32	Claremont f.....	70	24	45.4	1.73
Gila Bend * f.....	73	22	49.3	0.00	Cloverdale f.....	62	28	47.3	13.72
Globe f.....	66	31	42.2	0.79	Colegrove.....	.....	.....	.....	1.10
Holbrook f.....	63	—2	32.4	0.02	Colfax * f.....	60	20	39.3	13.43
Keams Canyon f.....	51 ^o	—8 ^o	25.5 ^o	0.17	Colton * f.....	68	29	48.5	0.20
Lochiel * f.....	65	15	41.2	0.35	Colusa f.....	59	25	43.4	3.37
Maricopa * f.....	77	25	43.3	0.32	Corning * f.....	66	32	44.8	3.90
Mount Huachuca f.....	65	14	41.5	0.35	Crescent City.....	.....	.....	.....	16.40
Natural Bridge f.....	.....	.....	.....	0.60	Crescent City L. H.....	.....	.....	.....	16.39
Navajo Springs * f.....	.....	.....	.....	0.18	Crofton * f.....	70	28	46.6	1.32
Oracle f.....	64	20	42.3	0.92	Davisville * f.....	63	30	44.8	3.50
Oro.....	.....	.....	.....	0.15	Deep Creek.....	.....	.....	.....	1.94
Palomas f.....	72	12	44.6	0.00	Delano * f.....	64	24	44.5	0.47
Pantano * f.....	63	28	43.1	0.00	Delta * f.....	55	23	42.3	14.30
Parker f.....	84	10	44.0	0.00	Dinuba * f.....	62	23	44.0	1.68
Payson * f.....	61	—5	34.0	1.24	Downey * f.....	80	30	52.9	0.74
Peoria f.....	68	28	48.2	0.15	Dry Creek * f.....	51	24	39.9	.....
Phoenix a f.....	.....	.....	.....	0.08	Drytown.....	58	22	42.7	6.32
Phoenix b f.....	71	23	46.0	0.00	Dunnigan * f.....	60	29	45.9	5.78
Red Rock * f.....	70	25	47.4	0.40	Dunsmuir * f.....	51	15	37.8	17.53
Reymert f.....	66	26	45.2	0.40	East Brother L. H.....	.....	.....	.....	1.93
Rye f.....	.....	.....	.....	0.33	Edgewood * f.....	48	10	30.2	5.13
St. Helena R'h f.....	71	21	44.8	0.44	Edmonton * f.....	54	4	30.2	17.46
San Carlos.....	71	15	40.8	0.63	Eldorado * f.....	62	26	45.8	8.74
San Simon * f.....	80	14	45.6	0.06	Elmira * f.....	65	28	45.4	8.12
Signal f.....	68	20	44.5	0.08	El Verano * f.....	61	27	46.2	11.86
Texas Hill * f.....	75	21	50.4	0.06	Emigrant Gap * f.....	47	11	30.6	10.10
Tucson a f.....	75	20	46.4	0.15	Escondido.....	77	30	50.8	1.18
Tucson b * f.....	68	28	47.7	0.19	Esparto * f.....	60	30	44.8	5.58
Walnut Ranch * f.....	63	14	38.9	0.60	Evergreen.....	.....	.....	.....	4.90
Whipple Barracks.....	67	—7	31.8	0.30	Exeter * f.....	66	28	46.9	1.89
Wilcox f.....	.....	.....	.....	0.66	Fall Brook * f.....	76	30	45.2	0.37
Willcox * f.....	68	18	38.8	0.50	Farmington * f.....	68	23	46.8	5.17

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
California—Cont'd.					California—Cont'd.				
Felton * f.....	74	20	48.2	11.36	Oakdale a * f.....	63	20	38.4	5.59
Fernando * f.....	70	28	47.0	0.59	Oakdale b * f.....	64	22	44.5	5.40
Florence * f.....	80	30	52.5	.....	Oakland a.....	58	29	44.7	9.02
Florin * f.....	57	25	44.4	4.41	Oakland b * f.....	62	31	46.1	8.45
Folsom City a * f.....	68	25	48.5	6.47	Ogilby * f.....	76	33	50.0	0.00
Folsom City b * f.....	62	26	46.3	5.89	Oleta * f.....	57	20	39.8	7.23
Fort Ross.....	.....	.....	.....	18.66	Ontario a * f.....	72	29	45.3	1.12
French Corral.....	62	24	43.9	7.17	Ontario b.....	74	25	47.4	1.75
Fresno * f.....	65	26	46.6	1.73	Orangevale f.....	57	24	44.6	5.85
Fruto * f.....	60	30	44.6	5.35	Orland * f.....	58	30	45.6	3.13
Galt * f.....	63	28	47.0	4.02	Oroville a * f.....	63	28	48.4	5.97
Georgetown f.....	58	15	39.5	13.89	Oroville b.....	65	27	47.0	5.97
Gilroy * f.....	64	22	45.7	4.71	Pajaro f.....	66	26	46.6	4.97
Girard * f.....	60	11	30.9	1.75	Palermo f.....	59	22	44.0	3.70
Glendora.....	.....	.....	.....	1.80	Palm Springs * f.....	78	25	50.2	0.00
Glen Ellen * f.....	58	25	44.6	18.67	Pasadena f.....	75	28	48.6	1.45
Gorman Station.....	.....	.....	.....	3.00	Paso Robles a * f.....	65	17	44.1	1.46
Goshen * f.....	66	22	45.8	1.45	Paso Robles b.....	63	19	42.4	1.06
Grass Valley a.....	.....	.....	.....	11.24	Petaluma * f.....	62	28	47.5	8.41
Green Valley.....	.....	.....	.....	2.18	Piedras Blancas L.H.....	.....	.....	.....	3.34
Gridley * f.....	59	19	42.2	9.49	Pigeon Point L. H.....	.....	.....	.....	2.24
Guinda.....	.....	.....	.....	7.15	Placerville a * f.....	62	23	41.7	11.55
Haywards * f.....	58	32	45.8	7.06	Placerville b.....	57	16	38.5	11.05
Healdsburg * f.....	56	28	41.1	12.21	Pleasanton a * f.....	70	22	47.4	4.18
Hendersons R'ch.....	.....	.....	.....	0.46	Pt. Ano Nuevo L. H.....	.....	.....	.....	8.00
Hollister * f.....	65	20	47.0	3.99	Point Arena L. H.....	.....	.....	.....	10.38
Hornbrook * f.....	55	18	36.4	3.20	Point Bonita L. H.....	.....	.....	.....	9.18
Humboldt L. H.....	.....	.....	.....	11.84	Pt. Conception L. H.....	.....	.....	.....	2.68
Huron * f.....	65	35	53.4	0.40	Point Fermin L. H.....	.....	.....	.....	0.29</

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
California—Cont'd.				Ins.	Colorado—Cont'd.				Ins.
Templeton*.....	63	20	44.9	1.58	Waller*.....	51	4	32.0	0.50
Towles*.....	60	12	37.3	13.76	Ward District.....	51	4	32.0	0.50
Tracy*.....	54	29	43.6	2.13	Watkins*.....	51	4	32.0	0.50
Traver*.....	59	30	45.9	1.51	Yuma.....	51	4	32.0	0.50
Trinidad L. H.....	72	28	48.9	0.72	Zuck.....	51	4	32.0	0.50
Tropic*.....	44	12	23.2	8.06	Connecticut.....				
Truckee*.....	44	12	23.2	8.06	Bridgeport*.....	49	12	30.3	2.92
Tulare*.....	69	25	45.7	1.16	Canton.....	47	6	27.4	2.90
Tulare*.....	78	24	47.4	1.24	Colchester.....	54	6	29.9	2.45
Turlock*.....	67	29	49.4	2.74	Falls Village.....	54	6	29.9	2.45
Turlock*.....	64	19	42.7	2.82	Greenfield Hill.....	54	6	29.9	2.45
Ukiah*.....	64	22	43.6	0.00	Hartford*.....	54	6	29.9	2.45
Upper Mattole*.....	73	27	48.0	27.56	Hartford*.....	54	6	29.9	2.45
Vacaville*.....	60	28	45.4	8.70	Lake Kononoc.....	54	6	29.9	2.45
Vacaville*.....	60	28	45.4	8.70	Lebanon.....	54	6	29.9	2.45
Valley Springs*.....	64	26	45.7	6.91	Middletown.....	54	6	29.9	2.45
Ventura*.....	69	33	50.0	0.81	New Hartford*.....	54	6	29.9	2.45
Vina*.....	57	29	45.5	4.18	N. Grosvenor Dale.....	54	6	29.9	2.45
Volcano Springs*.....	78	28	51.3	5.71	Norwalk.....	54	6	29.9	2.45
Walnut Creek.....	59	22	42.7	5.85	Southampton*.....	54	6	29.9	2.45
Weaverville*.....	73	17	42.6	11.47	South Manchester.....	54	6	29.9	2.45
Wenrich Ranch.....	55	25	40.0	1.05	Stevenson.....	54	6	29.9	2.45
West Butte*.....	55	25	40.0	1.05	Storrs.....	54	6	29.9	2.45
Westley*.....	63	22	46.7	1.93	Thompson.....	54	6	29.9	2.45
Wheatland.....	68	22	43.8	5.71	Voluntown*.....	54	6	29.9	2.45
Whittier*.....	78	32	55.2	0.65	Wallingford*.....	54	6	29.9	2.45
Williams*.....	60	26	43.4	3.27	Waterbury.....	54	6	29.9	2.45
Willows*.....	52	25	40.6	3.49	West Simsbury.....	54	6	29.9	2.45
Willows*.....	60	29	43.6	3.65	Delaware.....				
Winchester*.....	74	21	46.2	0.47	Dover*.....	61	20	38.0	2.77
Winters*.....	60	30	46.3	8.07	Kirkwood*.....	60	20	38.0	2.77
Wire Bridge*.....	60	22	43.8	9.18	Millford.....	60	20	38.0	2.77
Woodland*.....	58	30	43.5	3.99	Millsboro.....	60	20	38.0	2.77
Yerba Buena L. H.....	54	8	35.2	7.59	Seaford*.....	60	20	38.0	2.77
Yreka*.....	54	8	35.2	7.59	District of Columbia.....				
Yuba City*.....	60	32	46.0	4.95	Dist'ng Reserv'r*.....	55	18	37.2	1.15
Colorado.....					Rec'ng Reserv'r*.....	54	16	36.9	1.87
Abbot*.....	70	15	28.4	0.05	West Washington.....	54	17	39.0	2.04
Akron*.....	43	14	14.7	0.46	Florida.....				
Alma*.....	43	14	14.7	0.46	Amelia*.....	72	31	56.4	2.80
Amberst*.....	43	14	14.7	0.46	Archer*.....	72	31	56.4	2.80
Arboles.....	43	14	14.7	0.46	Brooksville*.....	72	31	56.4	2.80
Avoca.....	43	14	14.7	0.46	Clermont*.....	72	31	56.4	2.80
Boulder*.....	65	13	32.0	0.16	De Land*.....	70	30	62.0	1.92
Breckenridge*.....	57	28	12.0	2.65	Eustis*.....	70	30	62.0	1.92
Brush*.....	61	17	22.0	0.15	Federal Point*.....	70	30	62.0	1.92
Byers*.....	64	12	25.4	0.00	Fort Meade*.....	70	30	62.0	1.92
Canyon*.....	69	7	33.7	0.00	Grasmere*.....	70	30	62.0	1.92
Castle Rock*.....	64	11	26.8	0.20	Homeland*.....	70	30	62.0	1.92
Cheyenne Wells*.....	62	15	26.0	0.00	Kissimmee*.....	70	30	62.0	1.92
Climax*.....	36	15	7.7	4.83	Lake City*.....	70	30	62.0	1.92
Collbran.....	46	9	16.4	0.18	Manatee*.....	72	31	56.4	2.80
Como (near).....	46	9	16.4	0.18	Merritts Island*.....	74	30	65.0	1.63
Cope*.....	69	15	29.1	0.25	Moseley Hall*.....	74	30	65.0	1.63
Deer Trail*.....	65	4	30.9	0.25	Mullet Key*.....	73	48	63.0	0.90
Delta*.....	58	2	24.0	0.12	Myers*.....	81	41	63.8	0.68
Divide Ex. Station.....	60	12	23.8	0.12	New Smyrna*.....	79	34	61.2	2.27
Downing*.....	80	15	32.8	0.10	Ocala*.....	79	34	61.2	2.27
Dumont.....	86	8	25.6	0.30	Orange City*.....	80	31	60.0	2.21
First View*.....	64	15	29.8	0.05	Orlando*.....	83	36	63.5	1.86
Fort Collins*.....	63	22	23.9	0.25	Oxford*.....	78	33	58.7	2.29
Garnett.....	62	6	29.4	0.02	Plant City*.....	85	33	63.5	2.35
Glen Eyrie*.....	52	1	27.3	1.27	Saint Francis B'ks.....	78	33	58.0	3.48
Glenwood Sp'gs*.....	56	14	27.0	0.89	Saint Petersburg*.....	80	45	64.1	2.65
Gold Hill*.....	51	3	25.9	0.08	Tallahassee*.....	72	33	55.2	1.29
Grand Junction*.....	51	3	25.9	0.08	Tarpon Springs*.....	82	37	62.5	3.03
Greeley*.....	35	13	1.8	0.55	Georgia.....				
Gunnison*.....	62	12	27.8	0.15	Adairsville*.....	69	16	44.2	4.40
Hugo*.....	68	11	26.0	0.07	Alapaha*.....	77	28	52.7	2.64
Husted*.....	72	13	29.0	0.70	Albany*.....	77	28	52.7	2.64
Idaho Springs*.....	57	6	24.5	0.19	Americus*.....	70	27	47.0	4.79
Julesburg*.....	59	28	22.0	0.48	Athens*.....	70	27	47.0	4.79
Kit Carson*.....	70	10	24.8	0.10	Bainbridge*.....	75	32	53.9	3.86
La Jara*.....	56	10	23.6	0.02	Blakely*.....	75	32	53.9	3.86
La Porte.....	78	9	31.4	0.00	Bragg*.....	75	32	53.9	3.86
Las Animas*.....	46	23	14.6	1.12	Camilla.....	75	32	53.9	3.86
Lay*.....	46	23	14.6	1.12	Canton*.....	64	19	43.6	6.69
Le Roy*.....	56	10	22.4	0.35	Clayton*.....	66	18	46.8	4.12
McCoy*.....	51	22	14.9	1.86	Columbus*.....	79	28	52.8	2.40
Meeker*.....	80	12	33.1	0.05	Cordele*.....	74	26	50.8	2.30
Monte Vista*.....	50	12	19.5	0.01	Covington.....	73	24	48.4	3.81
Moraine*.....	49	16	22.5	0.40	Dahlonega*.....	68	23	46.4	6.76
Pagoda (near).....	44	23	17.6	1.85	Darien*.....	79	19	60.8	1.53
Paonia*.....	46	8	23.3	0.40	Diamond*.....	74	19	60.8	1.53
Parachute*.....	46	8	23.3	0.40	Dublin*.....	74	19	60.8	1.53
Red Cliff.....	70	0	31.7	0.10	Dublin*.....	74	19	60.8	1.53
Rico.....	71	0	31.7	0.10	Elberton*.....	68	25	46.6	5.27
River Bend*.....	70	0	31.7	0.10	Fleming*.....	79	26	52.7	0.93
Rocky Ford*.....	71	0	31.7	0.10	Forayth*.....	74	31	52.7	4.16
Saint Cloud.....	71	0	31.7	0.10	Fort Gaines*.....	70	10	53.0	3.30
Sanborn.....	71	0	31.7	0.10	Hawkinsville*.....	79	24	50.6	1.54
San Luis*.....	57	15	19.9	0.71	Hephzibah*.....	71	30	49.8	2.65
Scissors*.....	57	15	19.9	0.71	Lafayette*.....	65	16	45.1	4.68
Seibert*.....	57	15	19.9	0.71	Lagrange*.....	75	22	48.8	3.13
Smoky Hill Mine*.....	66	1	28.2	0.04	Lawrenceville*.....	75	15	43.2	3.20
Stamford*.....	52	8	19.6	0.50	Leverett*.....	70	21	46.0	2.46
Sunnyside.....	52	20	17.9	1.30	Louisville*.....	74	23	49.0	2.13
Surface Creek*.....	53	1	25.4	0.35	Lumpkin*.....	70	27	51.4	3.99
Thon*.....	64	6	28.9	0.06	McArthur*.....	75	29	52.5	1.51
T. S. Ranch*.....	51	0	24.0	0.30	Macon*.....	70	27	51.4	3.99
Twin Lakes.....	51	0	24.0	0.30	Marietta*.....	66	17	44.6	6.12
					Marshallville*.....	73	27	52.0	3.07

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Georgia—Cont'd.					Indiana—Cont'd.				
Millen†.....	78	23	50.6	1.24	Huntington.....	56	5	33.4	2.35
Monticello*†.....	70	29	49.4	4.00	Jasper†.....	65	10	36.8	3.42
Morgan†.....	77	29	54.0	3.77	Jeffersonville.....	62	4	38.8	2.81
Piscola.....	75	31	56.0	1.10	Kokomo†.....	60	9	32.3	1.79
Point Peter* ¹	68	26	46.5	3.95	Laconia.....	61	8	37.2	2.80
Poulan†.....	79	25	53.0	2.28	Lafayette†.....	61	17	32.0	2.19
Resaca†.....	79	25	53.0	2.28	Logansport†.....	60	12	31.7	1.68
Reynolds†.....	67	18	45.5	5.00	Logansport‡.....	60	12	31.7	1.68
Rome†.....	67	18	45.5	5.00	Madison†.....	63	6	39.1	3.33
Thomasville.....	76	29	53.8	1.02	Marengo* ¹	68	10	37.7	4.40
Toccoa†.....	64	24	44.4	5.90	Marion†.....	60	10	33.5	1.03
Union Point†.....	70	26	48.8	3.13	Markle†.....	56	8	31.8	1.66
Washington†.....	70	30	49.5	3.23	Mauzy.....	57	11	32.8	1.77
West Point†.....	74	22	47.8	4.38	Mount Vernon†.....	64	6	37.1	3.81
Whitesburg†.....	74	22	47.8	4.38	Muncie†.....	58	2	30.3	3.87
Idaho.....					New Albany*† ¹				
American Falls†.....	42	11	26.2	2.13	Princeton*† ¹	66	8	36.0	3.72
Boise Barracks.....	56	1	32.2	2.88	Rockville†.....	65	12	33.0	2.29
Chesterfield†.....	47	7	30.0	0.63	Rushville†.....	60	4	34.8	1.84
Egin†.....	38	18	16.9	1.17	Seymour.....	60	4	34.8	1.84
Fort Lemhi†.....	50	10	21.8	2.56	Shelbyville†.....	60	4	34.7	2.56
Fort Sherman†.....	42	5	25.1	8.70	South Bend†.....	59	10	39.7	0.89
Garden Valley†.....	39	7	23.8	5.45	Terre Haute†.....	65	4	35.7	1.68
Grangeville.....	47	5	27.8	4.86	Union City†.....	59	10	34.0	1.73
Kootenai†.....	48	4	24.2	3.85	Valparaiso†.....	58	12	26.6	1.70
Lake†.....	44	20	15.1	3.80	Veedsburg†.....	62	12	30.4	2.16
Martin†.....	45	13	17.8	2.53	Vevay.....	62	6	37.2	3.20
Moscow†.....	45	3	27.4	6.01	Washington†.....	66	8	34.7	2.29
Murray†.....	44	10	22.8	7.91	Indian Territory.....				
Nampa.....	62	1	33.1	0.99	Enfau†.....	73	3	42.7	2.30
Oakley†.....	48	1	29.8	0.30	Gwendolyn†.....	74	4	40.7	3.72
Paris†.....	52	14	22.5	1.50	Healdton†.....	79	1	46.0	1.79
Payette†.....	50	4	30.8	2.42	Kemp†.....	74	4	42.2	3.56
Salubria* ¹	42	2	25.5	5.45	Lehigh†.....	66	7	40.5	3.74
Illinois.....					South McAlester†.....				
Albion†.....	65	9	35.8	2.59	Tulsa†.....	66	7	37.0	1.64
Aurora†.....	60	17	25.6	2.70	Iowa.....				
Beardstown†.....	60	17	25.6	2.70	Algona* ¹	44	24	13.0	1.05
Bloomington†.....	65	24	27.9	2.32	Alta†.....	47	25	12.3	0.71
Braidwood†.....	62	15	30.4	1.16	Amana†.....	58	29	20.4	1.73
Bushnell†.....	68	15	28.0	1.05	Ames‡.....	55	37	15.6	1.06
Carlinville†.....	68	21	30.6	3.09	Ames‡.....	55	37	15.6	1.06
Carlyle.....	68	21	30.6	3.09	Ames‡.....	55	37	15.6	1.06
Cordova.....	68	21	30.6	3.09	Ames‡.....	55	37	15.6	1.06
Decatur†.....	67	22	32.2	1.83	Ames‡.....	55	37	15.6	1.06
Dixon†.....	62	26	23.4	2.15	Atlantic†.....	60	28	19.0	0.95
East Peoria†.....	68	18	30.2	2.44	Audubon.....	56	26	18.0	1.10
Effingham†.....	62	8	36.0	1.50	Belle Plaine.....	59	28	18.7	1.20
Fort Sheridan†.....	60	13	26.4	2.94	Bonaparte†.....	52	18	25.6	1.40
Galva†.....	63	19	25.4	1.64	Carroll†.....	56	30	17.4	1.17
Galeonda†.....	70	5	41.6	3.08	Cedar Falls†.....	56	27	16.9	1.75
Greenville†.....	69	12	34.7	2.45	Cedar Rapids†.....	58	23	21.9	1.51
Griggsville†.....	73	20	30.8	2.06	Centerville†.....	61	27	27.8	1.50
Havana†.....	68	11	32.8	2.08	Charles City†.....	52	26	15.6	1.42
Jordans Grove†.....	67	7	36.8	2.30	Clarinda†.....	50	22	20.4	0.48
Lagrange†.....	61	19	27.1	1.04	Clinton.....	62	28	23.3	2.02
Louisville†.....	68	6	35.9	2.41	College Springs.....	60	24	22.0	0.96
McLeansboro* ¹	66	10	30.7	2.35	Corning†.....	59	24	22.2	0.89
Martinsville†.....	65	7	32.5	2.43	Cresco†.....	52	24	15.0	0.99
Mascoutah* ⁶	65	13	32.1	1.17	Decorah†.....	53	24	17.3	1.14
Mattoon.....	65	9	37.1	1.53	Delaware* ⁸	55	28	16.6	0.96
Monmouth†.....	64	20	20.4	1.78	Denison†.....	52	28	13.9	0.95
Mount Carmel†.....	66	20	30.2	2.79	Elkader†.....	57	27	19.0	0.91
Mount Pulaski.....	66	20	30.2	2.79	Fairfield†.....	64	17	24.8	1.57
Muddy Valley* ³	66	20	30.2	2.79	Fort Madison*† ¹	64	16	28.6	2.05
Olney‡.....	65	10	36.6	2.27	Galva†.....	51	29	14.2	0.32
Olney‡.....	65	10	36.6	2.27	Greenwood†.....	62	22	23.2	0.32
Oregon†.....	62	20	25.0	1.63	Grand Meadow* ¹	54	22	18.7	1.18
Oswego* ¹	56	22	24.4	2.31	Greenfield†.....	58	25	20.4	0.91
Ottawa†.....	64	16	26.4	2.38	Grinnell†.....	57	20	21.1	0.91
Palestine†.....	65	9	34.2	2.21	Grundy Center.....	58	26	16.1	1.01
Paris†.....	64	11	31.7	2.95	Hampton.....	52	27	14.4	1.05
Peoria‡.....	67	17	29.6	2.60	Hawkeye.....	56	22	22.0	0.74
Philo†.....	64	25	29.8	2.38	Hopkinton* ⁵	56	26	23.2	1.30
Quincy†.....	67	17	29.6	2.60	Humboldt†.....	55	28	19.4	0.87
Rantoul*† ⁵	60	24	28.6	1.91	Independence†.....	55	28	19.4	0.87
Riley†.....	57	20	22.9	2.24	Indianola†.....	57	25	23.1	0.68
Rockford* ¹	60	20	24.8	1.47	Iowa City†.....	61	30	24.6	1.95
Rushville.....	68	13	29.2	2.70	Iowa Falls†.....	50	33	13.7	0.72
Saint John* ²	62	5	33.8	1.86	Keosauqua†.....	63	16	25.6	1.52
Streator†.....	58	16	26.8	1.90	Knoxville.....	57	22	20.9	0.90
Sycamore* ¹	58	18	24.9	2.50	Larrabee†.....	48	28	12.6	0.76
Tuscola*† ¹	61	16	29.2	1.53	Le Claire†.....	51	26	17.9	1.81
Vienna†.....	67	12	38.2	3.31	Logan†.....	51	26	17.9	0.74
Walnut†.....	64	20	25.7	2.11	Maxon* ¹	56	28	20.2	1.20
Warsaw†.....	63	12	38.5	3.79	Mechanicsville.....	59	22	20.8	1.45
Winnebago†.....	60	23	22.6	1.48	Monticello*† ¹	57	30	18.8	1.08
Indiana.....					Mount Pleasant* ²				
Angola* ¹	52	7	30.1	1.85	Mount Vernon* ¹	59	25	20.8	1.49
Ashboro†.....	67	10	35.6	2.11	Muscataine†.....	62	21	25.9	1.80
Bedford†.....	67	4	35.6	2.42	Newton.....	58	27	19.4	0.69
Butler†.....	60	12	30.0	0.67	Osage*† ³	51	24	12.5	0.75
Cambridge City†.....	55	8	32.6	1.57	Oskaloosa†.....	51	27	22.1	1.19
Columbia City* ¹	58	8	30.0	1.83	Ottumwa.....	63	20	25.2	2.10
Columbus.....	60	9	36.0	2.14	Ovid†.....	61	25	23.8	1.21
Connersville†.....	58	7	34.9	1.48	Panama†.....	55	25	17.5	0.37
Degonia Springs* ⁶	63	7	38.5	3.79	Richland†.....	57	27	21.0	1.65
Delphi.....	57	12	31.3	1.91	Rock Rapids.....	41	29	9.6	0.65
Evansville†.....	57	6	34.1	1.40	Rockwell City.....	57	27	21.0	1.65
Farmland†.....	57	6	34.1	1.40	Sac City†.....	47	30	14.0	1.35
Franklin* ¹	58	7	33.3	1.78	Seymour†.....	62	20	25.6	1.17
Hammond.....	58	16	30.4	1.39	Sibley.....	40	30	9.1	0.97
Hawpact†.....	53	5	27.4	1.65	Spirit Lake†.....	45	30	10.3	0.80
Huntingburg*† ¹	64	4	28.6	1.40	Tipton†.....	61	26	23.3	1.62
					Toledo* ¹				
					Villisca†.....				

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Iowa—Cont'd.					Louisiana.				
Vinton *1	57	-30	16.5	0.88	Abbeville	83	22	57.5	3.25
Washington	62	-24	23.2	1.10	Alexandria	82	18	55.0	5.92
Webster City *1	50	-26	15.3	1.12	Amite	79	13	51.4	6.99
West Bend *1	48	-26	10.7	0.90	Bastrop	77	21	54.6	3.61
Williams *1	46	-27	14.4	0.87	Baton Rouge	75	13	47.8	8.36
Winterset	57	-26	21.2	0.85	Calhoun	74	24	55.9	4.10
Kansas.					Cameron *1				
Abilene	74	-13	29.0	0.52	Cheneyville	78	19	59.0	5.63
Achilles *1	74	-26	17.0	0.41	Clinton	78	30	59.6	4.74
Allison *1	65	-21	20.0	0.38	Coushatta	78	14	49.2	6.90
Altona *1	69	-10	29.2	2.73	Coushatta	78	14	49.2	6.90
Atchison	69	-17	27.0	1.02	Covington	77	28	49.2	7.87
Beloit	65	-22	25.6	0.15	Davis	77	13	49.2	7.87
Bucklin	70	-13	30.7	1.86	Delhi	82	24	57.6	1.95
Burlington	70	-20	23.3	T.	Donaldsonville	76	24	54.3	1.96
Cawker City *1	60	-20	23.3	T.	Emilie	75	14	51.6	9.08
Colby	72	-26	25.4	0.41	Farmerville	77	25	57.2	1.83
Coldwater	72	-12	30.8	0.40	Franklin	74	14	44.5	6.29
Columbus	73	-14	32.6	3.12	Girard	76	23	55.4	4.30
Coolidge	72	-11	27.6	T.	Grand Coteau	80	22	54.8	1.78
Cunningham	68	-14	29.8	0.20	Houma	80	26	60.9	0.90
Downs	72	-11	30.5	1.15	Jeanerette	81	24	55.4	3.37
Eldorado	74	-9	33.0	1.75	Lafayette	80	22	56.6	4.47
Elk City *1	70	-12	31.4	1.10	Lake Charles	74	18	52.4	3.40
Emporia	77	-9	32.2	T.	Lake Providence	75	13	49.0	0.31
Englewood	65	-21	26.0	0.16	Lawrence	80	30	56.8	1.21
Eureka Ranch	74	-14	30.6	0.20	Liberty Hill	83	21	55.8	2.50
Fort Riley	67	-15	28.5	T.	Maurepas	78	39	58.8	4.14
Garden City	72	-10	31.5	1.95	Melville	77	13	51.6	6.99
Garfield	68	-18	29.2	0.53	Minden	73	14	51.0	7.34
Grenola *1	69	-22	26.2	T.	Monroe	77	12	52.7	6.81
Halstead	66	-16	26.8	1.03	Natchitoches	77	22	58.2	2.17
Hays City	73	-14	33.6	0.30	New Iberia	77	20	56.0	3.98
Horton	75	-10	33.0	3.38	Opelousas	79	15	50.4	0.45
Hutchinson	73	-11	34.6	0.40	Oxford	80	24	57.7	2.51
Independence	75	-10	33.0	3.38	Paincourtville	74	14	48.6	3.77
Keosauqua	72	-14	30.4	1.50	Plaquemine	79	25	57.6	2.59
Lakin	72	-14	30.4	1.50	Roseland	80	19	55.2	4.85
Lebo	70	-21	29.8	0.12	Schriever	81	20	56.0	4.40
Leoti	68	-16	29.0	0.25	Shell Beach	79	24	59.2	2.31
Macksville	70	-21	29.8	0.12	Sugar Ex. Station	75	22	56.8	4.40
McPherson	64	-17	26.4	0.41	Wallace	77	26	56.6	1.32
Manhattan	74	-14	32.4	0.71	West End	81	24	56.6	2.05
Manhattan *1	69	-14	25.0	0.72	Winnfield	78	15	52.2	7.44
Marion	73	-14	29.6	0.59	Maine.				
Marmaton	73	-14	29.6	0.59	Bar Harbor	51	-3	23.6	3.46
Medicine Lodge	73	-14	29.6	0.59	Belfast	38	-9	18.0	4.37
Minneapolis	72	-16	26.7	0.05	Calais	47	-16	16.8	3.08
Morland	72	-21	26.1	0.39	Cornish *1	44	-3	20.9	2.32
Morton	76	-9	33.4	0.20	East Machias	50	-17	17.6	2.53
Mount Hope *1	72	-12	32.3	0.51	Easton	40	-21	9.6	2.30
Norton	63	-18	25.7	0.41	Fairfield	45	-27	14.0	2.43
Oberlin	74	-16	32.2	2.38	Farmington	48	-18	16.6	1.64
Oswego	66	-22	25.2	0.03	Fort Kent	38	-40	3.8	1.85
Phillipsburg	68	-20	27.0	0.05	Gardiner	51	-13	16.5	3.30
Pleasant Dale	75	-10	32.8	1.87	Houlton	49	-39	7.2	2.54
Rome *1	74	-10	33.6	3.45	Indian Stream	38	-25	11.4	3.15
Sedan	69	-14	32.2	0.10	Kents Hill	41	-12	14.8	2.93
Sterling	71	-15	30.2	T.	Lewiston	40	-28	16.0	3.23
Topeka	71	-15	30.2	T.	Madison *1	40	-36	8.2	1.79
Tribune	71	-15	30.2	T.	Mattawamkeag	37	-8	17.9	1.64
Wakefield	73	-14	25.6	0.58	North Bridgeton	43	-8	17.9	1.64
Wallace	70	-14	26.2	1.00	Orono	46	-32	12.4	3.01
Wamego	70	-14	26.2	1.00	Petit Menan	45	0	27.2	0.72
Washington	73	-20	26.2	0.42	West Jonesport *1	39	-15	19.1	3.84
Yates Center	70	-14	26.2	0.42	Maryland.				
Kentucky.					Bachmans Val. *1	50	12	30.2	1.24
Alpha *1	72	-7	47.5	3.08	Benedict	62	20	39.2	2.37
Bowling Green *1	65	-7	38.8	3.43	Boettcherville *1	64	14	34.4	1.30
Bowling Green	72	-6	39.2	3.09	Cambridge	58	27	40.2	3.13
Burnside	64	-8	41.5	4.30	Charlotte Hall	58	17	38.6	2.11
Caddo *1	70	-3	41.6	3.24	Chestertown	53	20	37.0	2.24
Canton *1	62	-4	39.0	1.50	Cumberland	64	14	35.0	1.22
Carrollton *1	62	-4	39.0	1.50	Cumberland	67	18	39.8	1.28
Catlettsburg *1	62	-4	41.2	2.54	Darlington	54	16	35.6	1.52
Earlington	72	-5	40.8	2.25	Easton	57	22	39.0	2.44
Eddyville	64	-4	39.8	3.31	Fallston	53	18	35.5	2.08
Edmonton	65	-6	37.4	3.07	Fenby	60	16	34.4	2.00
Elizabethtown	67	-7	38.6	2.66	Great Falls *1	53	13	35.9	1.56
Eubank	67	-7	38.6	2.66	McDonogh	59	16	38.4	2.30
Falmouth	71	-4	40.8	2.86	Mardela Springs	62	19	38.5	2.30
Ford's Ferry	78	-5	42.9	3.86	Mt. St. Marys Col.	57	10	33.0	2.36
Franklin *1	64	-5	38.5	3.39	New Market *1	58	20	34.8	1.19
Greendale *1	66	-5	39.3	2.92	Oakland	56	9	32.4	3.70
Greensburg *1	71	-8	39.4	3.10	Solomons	60	23	40.8	2.43
Harrodsburg	64	-5	38.3	3.92	Sunnyside	56	3	31.4	2.84
Henderson	67	-8	35.1	2.70	Taneytown	57	14	37.8	1.74
Hendricks	67	-8	35.1	2.70	Upper Marlboro	57	14	37.8	1.74
Lagrange	67	-8	35.1	2.70	Valley Lee	57	14	37.8	1.74
Louis	64	-5	40.6	4.12	Woodstock	64	13	35.9	2.06
Middleboro	64	-5	40.6	4.12	Massachusetts.				
Mount Sterling	62	-4	36.5	3.52	Adams	55	0	27.4	2.60
Mount Vernon	64	-6	41.6	4.69	Amherst	53	-1	26.6	2.60
Munfordsville *1	64	-6	41.6	4.69	Amherst Ex. St'n	52	0	25.4	2.43
Paducah	72	-4	40.6	2.94	Amherst Ex. St'n	53	1	26.4	2.16
Paducah	72	-4	40.6	2.94	Andover	51	6	27.2	2.96
Pellville	64	-12	39.2	2.16	Ashland	54	0	27.8	3.95
Princeton	70	-9	35.1	2.22	Bedford	54	0	27.8	2.74
Russellville	69	-6	41.0	3.72	Beverly Farms	50	-2	27.3	3.77
Sandy Hook	68	-4	39.8	2.48	Blue Hill (sum't)	54	-1	27.6	3.15
Shelby City *1	64	-3	39.6	2.63	Blue Hill (valley)	55	-2	27.5	3.37
Shelbyville	64	-3	39.6	2.63	Boston	54	0	27.8	3.84
South Fork	69	-5	36.1	2.18					
Springfield	69	-5	40.6	3.41					
Williamsburg	71	-8	39.4	3.10					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Massachusetts—Con.					Michigan—Cont'd.				
Brookton a.....	56	0	28.7	2.78	Hanover.....	53	5	30.8	1.36
Brookton b.....	57	1	28.2	2.67	Harbor Springs.....	48	4	23.6	3.82
Cambridge a.....	57	1	28.2	3.33	Harrison.....	49	11	23.4	2.53
Cambridge b.....	56	0	27.6	3.05	Harrisville.....	48	10	23.2	2.93
Chestnut Hill.....	56	0	28.6	3.90	Hart.....	55	5	34.2	.....
Clinton.....	57	3	25.3	2.55	Hayes.....	52	0	27.1	1.14
Concord f.....	57	3	25.3	2.47	Howell.....	52	14	26.4	1.15
Dudley.....	54	2	27.2	2.01	Jeddo.....	49	5	26.2	0.93
East Templeton *1.	50	2	25.0	4.72	Kalamazoo.....	52	4	28.8	1.57
Egg Rock, Nahant..	50	0	28.2	.....	Lake City.....	52	6	.....	1.70
Fall River *1.....	55	5	31.1	3.43	Lansing.....	53	4	27.2	1.70
Fiskdale.....	56	0	26.1	1.58	Lathrop *1.....	44	16	15.2	1.61
Fitchburg a *1.....	52	0	26.1	2.99	Lewiston.....	48	3	21.8	1.83
Fitchburg b.....	56	1	26.2	2.65	Lodi.....	47	5	22.2	2.23
Framingham.....	54	6	26.7	4.23	Madison.....	53	0	29.0	1.04
Gilbertville.....	52	2	25.9	3.24	Mayville.....	53	4	25.2	2.24
Great Barrington..	53	0	25.8	.....	Mio.....	44	7	21.4	.....
Groton a.....	52	3	25.3	2.44	Mottville.....	54	18	29.0	1.73
Hingham.....	50	6	33.8	5.77	North Marshall.....	57	10	26.4	1.50
Hyannis.....	45	3	27.4	5.01	Olivet.....	54	7	27.8	1.00
Kendall Green.....	58	9	27.5	3.95	Ovid.....	53	5	27.0	1.80
Lake Cochituate..	53	2	25.8	3.00	Paris.....	58	11	23.8	3.37
Lawrence.....	53	2	25.8	3.00	Parkville.....	52	5	30.4	1.83
Leeds.....	51	1	23.8	2.26	Rawsonville *1.	57	21	16.5	1.12
Leicester.....	54	3	28.8	0.63	Rockland.....	57	4	30.0	0.80
Leominster *1.....	46	1	25.0	2.27	Saint Ignace.....	42	7	19.0	3.14
Long Plain *1.....	48	2	26.8	5.46	Sand Beach.....	52	3	26.0	.....
Lowell a.....	46	2	25.4	3.35	Stanton.....	52	2	25.8	2.51
Lowell b.....	47	3	25.5	.....	Thornville.....	54	0	29.4	0.99
Lowell c.....	50	1	28.0	.....	Vanalia.....	54	15	29.0	2.75
Ludlow Center.....	47	1	24.5	2.32	Williamston *1.	51	4	30.6	1.40
Lynn a.....	53	1	28.8	2.84	Ypsilanti.....	53	11	28.5	1.22
Lynn b.....	55	2	28.0	.....	Minnesota.				
Mansfield *1.....	53	0	27.9	3.79	Ada f.....	48	35	1.4	0.26
Medford.....	56	1	28.5	3.07	Alexandria f.....	44	33	1.8	0.45
Middleboro.....	54	1	29.8	4.62	Alexandria b.....	40	34	6.6	0.70
Milton.....	50	5	22.7	2.13	Barrett *1.....	50	31	6.8	0.56
Monroe.....	55	0	26.2	3.12	Beardsley f.....	37	32	7.6	0.58
Monson f.....	55	0	26.2	3.06	Belle Plaine *1.	37	29	8.0	.....
Mount Nonotuck..	50	3	30.1	4.85	Bingham Lake f.....	37	27	6.7	0.52
Mystic Lake.....	55	3	31.1	5.13	Blooming Prairie *1.	48	30	9.2	0.65
Mystic Station.....	55	0	27.8	3.42	Bonniwells Mills f.	40	27	10.8	0.75
New Bedford a *1.	55	3	31.1	5.13	Caledonia f.....	50	24	15.6	1.42
New Bedford b.....	55	0	27.8	3.42	Cambridge f.....	42	38	9.2	0.98
Newburyport.....	57	4	33.2	4.26	Camden f.....	44	28	8.7	0.66
North Billerica..	51	6	32.2	3.98	Clear Lake *1 f.	42	35	7.0	0.67
Plymouth *1.....	57	4	33.2	4.26	Clearwater *1.....	39	29	10.9	0.94
Provincetown.....	51	6	32.2	3.98	Collegeville.....	46	28	13.0	0.66
Randolph.....	56	2	30.1	3.14	Cromwell *1.....	34	30	0.7	0.49
Roberts Dam.....	42	2	24.5	2.72	Crookston f.....	39	31	1.3	0.48
Roxbury.....	56	2	30.1	3.14	Dassel *1.....	38	32	8.9	.....
Royalston *1.....	42	2	24.5	2.72	Dawson *1.....	38	31	4.2	1.37
Salem.....	56	2	30.1	3.14	Excel *1.....	44	24	.....	1.22
Salisbury.....	56	4	31.0	2.88	Farmington f.....	44	30	8.8	1.22
Somerset *1.....	49	6	31.7	5.56	Fergus Falls f.....	43	31	4.2	0.55
South Dennis.....	52	4	27.3	2.30	Fort Ripley f.....	49	25	10.2	0.55
Springfield Arm'y.	56	3	29.9	3.62	Grand Meadow f.....	47	33	5.0	0.41
Taunton a.....	56	2	29.2	4.31	Granite Falls.....	43	29	10.0	1.25
Taunton b.....	50	0	27.6	3.22	Hastings.....	36	28	7.5	0.60
Taunton c.....	46	2	26.6	1.75	Hutchinson *1.....	44	36	3.8	0.86
Turners Falls.....	56	3	26.9	3.33	L Winnibigoshish *1.	46	49	7.0	0.98
Wakefield f.....	56	3	26.9	3.33	Leech Lake *1.....	46	39	9.1	1.50
Waltham.....	56	3	26.9	3.33	Maple Plain.....	48	41	4.9	1.35
Webster.....	56	4	27.5	4.39	Marfield f.....	50	24	11.8	1.10
Westley.....	55	1	28.3	3.10	Mazepa *1.....	45	26	9.2	0.84
Westboro f.....	55	1	28.3	3.10	Medford f.....	39	34	3.3	0.72
Williamstown.....	55	1	26.1	2.54	Minneapolis a f.....	41	28	10.1	1.37
Winchendon f.....	53	0	28.0	2.87	Minneapolis b.....	42	27	10.8	1.43
Winchester.....	54	1	27.0	1.99	Minnesota City f.	54	20	15.7	0.99
Worcester a.....	54	0	27.2	2.98	Montevideo f.....	38	31	4.2	0.71
Worcester b.....	54	0	27.2	2.98	Morris.....	40	30	6.9	0.93
Michigan.					New London.....	42	22	11.9	.....
Adrian.....	63	9	29.6	1.47	New Richmond *1 a.	44	32	10.7	0.20
Albion.....	57	2	30.2	2.03	North Branch *1.	42	40	10.8	.....
Allegan.....	55	1	29.7	1.86	Ortonville f.....	43	41	3.4	0.67
Alma.....	52	18	25.7	3.17	Park Rapids *1.....	48	40	5.9	0.77
Ann Arbor.....	52	4	28.6	1.05	Pine River *1.....	47	47	1.8	1.11
Arbela *1.....	51	7	26.5	0.95	Pokegama Falls f.	54	47	1.8	1.11
Bell Mountain.....	50	6	24.7	1.40	Red Lake f.....	46	46	1.7	0.39
Bear Lake.....	50	5	23.1	1.24	Red Wing f.....	50	23	12.6	0.95
Bellaire.....	57	2	31.3	2.11	Rolling Green f.....	44	27	9.8	1.70
Benton Harbor.....	48	2	23.9	5.30	Saint Charles f.....	50	23	13.0	1.04
Benzonia.....	47	4	26.6	1.24	Saint Cloud *1.....	37	40	8.9	0.81
Berlin *1.....	56	10	31.7	2.31	Saint Olof.....	41	26	5.9	0.70
Berrien Springs a *1.	52	5	28.5	0.95	Saint Peter f.....	44	28	11.0	0.91
Berrien Springs b *1.	48	8	22.4	3.55	Sandy Lake Dam *1.	46	40	6.3	1.22
Birmingham.....	54	10	27.0	0.94	Sauk Center.....	38	45	5.3	0.57
Boon.....	51	3	26.2	1.16	Starbuck.....	37	32	3.5	0.97
Bronson.....	49	4	15.8	2.48	Wabasha *1.....	48	20	14.0	1.09
Brown City.....	54	4	24.3	2.05	Warren f.....	40	37	3.0	1.19
Calumet.....	48	20	19.2	2.46	Willmar f.....	35	29	5.0	0.73
Charlevoix.....	49	5	28.6	1.23	Winona.....	51	17	15.0	1.14
Cheboygan.....	53	8	28.3	1.26	Worthington.....	40	28	7.8	0.98
Climax *1.....	52	23	12.6	0.50	Mississippi.				
Clinton.....	50	7	26.2	2.26	Aberdeen.....	70	8	48.2	7.83
Crystal Falls.....	51	10	27.6	1.59	Agricultural Col'ge.	69	5	46.6	7.11
Fairview.....	55	8	26.1	1.84	Batesville f.....	74	26	52.8	1.59
Fitchburg.....	51	13	21.0	3.25	Biloxi f.....	75	18	52.4	3.69
Flint.....	54	6	30.2	3.08	Briers.....	75	14	48.5	5.37
Gaylord.....	55	4	31.6	0.76	Brookhaven f.....	75	14	48.5	5.37
Grand Rapids.....	46	18	19.5	1.60					
Grape.....	50	0	22.6	.....				
Grayling.....									
Hammonds Bay *1.									

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Mississippi—Cont'd.	0	0	0	Ins.	Missouri—Cont'd.	0	0	0	Ins.
Canton f.	78	18	50.7	5.22	Saint Charles	73	-17	33.4	2.86
Clarksdale f.	70	8	49.9	6.19	Saint Joseph f.	71	-10	33.8	2.70
Columbus a f.	79	15	52.4	7.05	Saint Louis	71	-10	33.8	2.70
Corinth f.	79	15	52.4	7.05	Sarcoxie	72	-19	30.9	2.86
Crystal Springs f.	79	15	52.4	7.05	Sedalia	72	-19	30.9	2.86
Edwards	73	16	50.5	5.64	Steffenville	73	-24	33.2	3.26
French Camps f.	70	9	45.6	7.46	Stellada f.	73	-24	33.2	3.26
Greenville a	68	12	47.0	7.23	Unionville	62	-22	25.2	1.09
Greenville b f.	76	12	49.8	7.37	Vermont * f.	55	-15	29.0	2.76
Hattiesburg f.	82	22	55.4	3.14	Vilas	62	-22	25.2	1.09
Hernando f.	70	0	46.6	2.94	Virgil City	70	-13	31.6	2.85
Itta Bena * f.	74	10	50.2	7.09	Warrensburg * f.	70	-13	31.6	2.85
Jackson f.	74	15	51.8	4.47	Warrenton	70	-15	33.8	3.39
Kosciusko f.	73	10	49.2	4.37	Wheatland	70	-15	33.8	3.39
Lake f.	70	14	49.2	6.49	Montana.				
Leakesville f.	82	22	56.4	0.93	Boulder f.	48	-29	18.6	0.77
Logtown f.	75	25	54.8	1.79	Choteau f.	56	-26	19.2	1.22
Louisville f.	74	6	48.0	5.15	Cokedale * f.	44	-29	16.2	2.20
Macon f.	69	9	47.2	7.11	Deer Lodge City f.	48	-32	22.0	0.83
Moss Point f.	76	26	56.2		Dry Fork f.	55	-22	19.4	0.93
Natchez f.	80	17	53.0	5.27	Fort Custer f.	56	-22	19.4	0.93
Okolona f.	71	8	48.2	7.25	Fort Keogh	48	-31	7.0	0.50
Palo Alto f.	71	8	48.2	7.25	Fort Logan f.	45	-31	15.8	1.30
Pontotoc f.	71	8	48.2	7.25	Fort Missoula	58	-15	20.0	1.96
Port Gibson f.	79	13	51.0	6.05	Glasgow f.	53	-32	6.6	0.30
Stonington * f.	76	18	54.7		Glendive f.	50	-30	9.4	0.50
Thornton * f.	74	18	52.6	5.60	Great Falls f.	54	-28	17.4	0.84
Topcon * f.	70	14	48.2	4.90	Hogan f.	47	-32	17.7	1.81
Vaiden f.	82	11	49.6	4.61	Martinsdale f.	45	-28	17.3	2.36
Water Valley * f.	72	5	47.4	6.27	Mingusville f.	63	-38	11.8	1.14
Waynesboro a f.	73	17	48.2	3.90	Musselshell f.	52	-34	14.5	1.70
Woodville	78	16	54.0	7.46	Red Rock * f.	45	-16	17.4	0.47
Yazoo City f.	80	15	52.1	6.44	Virginia City f.	46	-16	21.2	0.45
Missouri.					Nebraska.				
Akron.				0.95	Agee * f.	48	-31	12.6	0.73
Appleton City f.	71	-14	32.7	3.55	Arberville * f.	52	-27	20.7	0.40
Arlington f.				2.48	Ashland f.	63	-22	21.0	0.26
Arthur * f.				2.92	Ashton * f.	56	-28	16.8	0.28
Bethany	61	-20	25.4	1.22	Bassett * f.	50	-25	14.2	1.75
Big Piney.				2.30	Beatrice f.	64	-17	23.8	0.42
Birch Tree.	70	-14	37.8	2.27	Beaver City	63	-24	24.2	0.51
Bluffton * f.	72	-16	34.0	2.55	Belvidere	68	-22	23.4	0.21
Boonville f.				2.64	Bratton * f.	60	-19	23.2	0.41
Brunswick	70	-19	29.0	3.20	Burwell * f.	46	-32	16.0	1.00
Carrollton f.	69	-14	30.8	2.40	Callaway f.	59	-30	21.0	0.20
Conception	50	-20	19.8	0.70	Columbia f.	52	-28	17.0	0.65
Cowgill				0.20	Cornelia				0.14
Darksville f.	66	-16	31.8	2.95	Creighton * f.	51	-28	12.6	0.60
Downing				2.05	Crete	58	-20	22.2	0.07
East Lynne * f.				3.09	Culbertson				0.10
Edge Hill * f.				2.94	David City * f.	60	-22	15.8	0.60
Eight Mile * f.	69	-16	29.8	3.06	Erie * f.	51	-31	16.8	0.70
Eldon * f.	72	-14	34.7	3.15	Ewing f.	67	-16	27.0	0.09
Emma * f.				2.85	Fairbury * f.	67	-16	27.0	0.15
Fairport				1.47	Fort Robinson	55	-26	20.4	0.61
Fayette	74	-17	31.2	2.87	Fort Sidney	57	-23	24.8	0.20
Fox Creek * f.	72	-12	34.6	2.82	Franklin f.	62	-24	23.8	0.80
Fulton				2.75	Geneva f.	61	-21	23.2	0.80
Gallatin * f.	65	-18	27.9	1.51	Genoa f.	56	-27	17.9	0.59
Gary * f.				2.85	Gering f.	62	-24	21.7	0.29
Glasgow	73	-16	31.1	2.85	Glenwood * f.	56	-31	11.2	0.90
Gordonville * f.				2.46	Haigler * f.	75	-21	22.4	0.40
Gorin * f.	56	-10	26.6	1.76	Hartington f.	47	-29	12.5	0.70
Grove Dale	75	-35	35.6	2.74	Harvard * f.	61	-24	19.8	0.63
Half Way				3.07	Hay Springs f.	48	-34	14.1	0.71
Harrisonville f.	70	-16	27.4	2.70	Hebron f.	71	-20	23.9	0.19
Hastain	66	-17	32.0	3.00	Holdrege * f.				1.05
Hermann f.				3.00	Indianola * f.	72	-26	24.1	0.30
Houston	66	-21	34.8	1.58	Kennedy * f.	59	-20	17.7	0.60
Ironton * f.	68	-10	35.2	2.43	Kimball f.	62	-20	25.8	1.10
Jefferson City f.	71	-15	31.0	2.60	Lexington f.	70	-27	24.3	1.80
Kidder	65	-19	27.1	1.40	Lincoln	66	-19	22.5	0.38
Lamar f.	70	-14	33.9	2.77	Lynch * f.	48	-32	12.0	0.46
Lamonte f.				3.19	Madrid * f.	54	-29	20.8	0.70
La Plata * f.	64	-14	27.6	2.42	Marquette * f.	57	-24	20.8	0.80
Lebanon	72	-18	35.6	2.29	Minden * f.	60	-25	21.6	0.73
Lexington f.	71	-17	30.7	2.95	Mullen * f.	60	-28	19.6	1.30
Liberty	67	-13	30.0	1.57	Nebraska City * f.	55	-17	20.0	0.20
Linn Creek	74	-27	31.2	1.20	Nesbit f.	55	-32	20.4	0.60
Louisiana Bridge f.				1.69	Norfolk f.	60	-27	17.0	0.20
McCune * f.	69	-22	29.4	2.25	North Loup f.	54	-28	19.0	0.28
Marceline				1.48	Ogallala f.	56	-27	20.2	0.28
Marshall f.	72	-16	29.2	2.72	O'Neill * f.	56	-31	13.5	0.65
Mexico f.	72	-15	29.0	2.10	Ough f.				0.20
Mine La Motte f.	71	-11	36.8	2.16	Plattsburgh f.	62	-25	21.5	0.73
Neosho	77	-27	33.8	5.36	Ravenna				0.20
New Boston	66	-15	24.6	2.35	Red Cloud				0.20
New Hartford * f.	73	-22	30.7	2.15	Santee Agency f.	51	-30	13.3	0.48
New Haven * f.	72	-13	32.6	3.17	Seward * f.	60	-15	22.4	0.40
New Madrid	69	-8	41.6	3.25	Springview	48	-31	15.2	0.37
New Palestine				2.39	Stanton * f.	47	-27	15.0	0.40
Oakfield f.	73	-13	35.2	2.73	State Farm	69	-20	22.4	0.48
Oak Ridge * f.				3.12	Superior * f.	55	-23	24.4	0.76
Olden f.	67	-11	39.0	2.41	Sutton	58	-21	21.8	0.14
Oregon a.	65	-19	26.0	1.21	Table Rock * f.	65	-21	24.9	0.46
Oregon b f.	62	-15	26.2	1.17	Tecumseh f.	61	-19	22.3	0.60
Palmyra				2.35	Wallace * f.	62	-26	21.9	0.45
Panacea	73	-24	34.8	2.66	Weeping Water * f.	60	-24	17.5	0.68
Phillipsburg * f.	68	-22	34.7	2.24	West Point * f.	59	-27	24.6	0.17
Pickering * f.				0.90	Whitman * f.	48	-25	15.1	0.90
Platte River * f.	64	-12	25.6	1.15	Wilcox				0.14
Poplar Bluff	70	-9	39.0	2.97	York * f.	64	-7	23.4	0.16
Potosi	67	-15	32.4	2.43	Nevada.				
Princeton * f.	64	-20	25.6	1.50	Austin	47	-7	26.4	1.39
Round Springs				2.57	Battle Mountain * f.	49	0	35.0	0.38

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Nevada—Cont'd.	0	0	0	Ins.	New Jersey—Cont'd.	0	0	0	Ins.
Belleville **	70	0	27.4	0.30	New Brunswick a.	56	11	33.4	2.06
Belmont	44	-12	20.8	1.04	New Brunswick b.	58	10	33.0	2.22
Beowawe **	45	-11	26.3	0.65	Newton	56	10	30.5	2.15
Candelaria	65	-5	31.0	0.41	Ocean City	55	21	37.0	2.77
Carlin **	38	-25	21.2	1.98	Oceanic	58	18	36.8	2.74
Carson City	57	-7	32.0	2.33	Pateron	60	14	33.8	2.78
Crane Ranch				1.07	Pensacola				1.58
Downeyville	66	-6	34.7	0.39	Perth Amboy	58	11	33.5	2.04
Edgewood	49	-5	26.4	2.38	Plainfield	59	8	32.8	2.44
Elko **	45	-24	24.3	1.10	Rancocas *	58	17	32.1	1.98
Ely	68	-17	24.0	0.65	Readington **	60	18	36.4	2.00
Empire Ranch †	38	-20	15.8	1.05	River Vale	52	-4	30.6	2.00
Eureka				1.39	Salem	54	15	34.8	2.53
Fenelon **	45	-5	25.6	0.30	Somerville	59	3	33.2	2.09
Genoa	56	5	32.2	2.90	South Orange	58	12	32.5	2.11
Goldconda *	58	4	33.1	0.78	Tenafly	55	8	31.2	3.80
Gold Hill	67	4	35.8	1.89	Toms River	59	14	36.0	3.30
Halleck **	48	-30	20.3	1.50	Trenton	58	15	36.9	1.75
Hawthorne a **	59	4	33.0	0.70	Vineland	59	14	36.4	2.43
Hawthorne b	63	-5	32.6	0.57	Whiting	60	12	37.1	2.68
Hot Springs †	55	-2	30.2	0.25	Woodbine	58	15	35.8	3.03
Humboldt *	50	3	28.4	1.90	New Mexico.				
Lewers Ranch	55	-2	32.7	5.53	Albert †	67	5	38.3	0.00
Lovelock **	56	4	30.7	0.00	Albuquerque †	55	0	31.0	0.01
Mill City **	48	0	30.7	0.00	Bloomfield †	57	-4	25.0	0.15
Monitors Ranch	45	-18	22.5	0.96	Chama †	58	-18	22.1	1.60
Palisade *	60	-14	24.6	2.20	Coolidge †	54	10	35.0	0.30
Palmetto	53	-17	25.4	1.10	Deming *	73	8	44.9	0.05
Reno **	61	-2	34.0	0.90	East Las Vegas †	63	0	33.0	0.10
Reno State Univ'ty.	55	-7	30.9	0.89	Estalina Springs †	56	-10	29.0	0.44
Saint Clair	59	-5	33.0	0.09	Folsom †	68	-4	31.6	0.00
South Camp †	54	-3	28.2	2.70	Fort Stanton †	67	-1	35.1	0.00
Stofel	59	-27	21.7	3.81	Fort Wingate	72	-8	31.2	0.55
Sunnyside	60	-20	19.4	0.55	Galisteo †	52	5	30.5	0.30
Tecoma **	36	0	20.1	0.78	Gallinas Spring †	68	3	35.7	0.10
Toano *	42	-6	23.6	0.80	Halls Peak †	61	-5	29.6	T.
Tybo	52	-10	26.7	0.47	La Luz †	65	15	40.4	0.13
Verdi **	58	0	32.4	3.50	Las Cruces †	71	2	37.1	0.08
Virginia City	50	4	31.4	3.54	Lordsburg **	53	6	39.6	0.70
Wadsworth **	61	-4	32.1	0.40	Los Lunas †	52	7	29.0	0.00
Wells **	48	-22	20.8	1.05	Monero †	50	-19	16.7	0.94
Winnevuoca **	53	-4	29.3	0.63	Olfo †	49	-1	26.9	0.00
New Hampshire.					Socorro †	62	4	36.0	0.14
Astend **	38	-5	19.8	2.11	Taos †	52	-18	23.5	0.78
Antrim				2.50	New York.				
Belmont				2.34	Addison	57	3	31.1	1.94
Berlin	49	-18	15.8	...	Alfred Center	51	-4	27.5	3.02
Berlin Mills	50	-18	17.0	2.85	Angelica †	53	-8	28.4	3.02
Bethlehem	46	-13	18.6	2.71	Arcade	51	2	27.2	3.12
Brookline *	45	-2	26.0	2.67	Atlanta				2.10
Concord	49	-8	19.8	2.76	Baldwinsville	55	-1	26.6	3.07
Dublin	50	-7	23.0	2.40	Bedford				3.35
Durham	52	-4	23.1	2.17	Binghamton †	54	5	29.0	2.18
East Canterbury	47	-10	20.6	2.58	Bolivar				3.68
Grafton	45	-5	20.2	2.26	Boonville				3.73
Hanover	46	-4	20.3	2.16	Bovina Center				5.48
Keene	47	-2	22.9	1.91	Brentwood	55	-3	32.1	3.91
Lakeport				3.55	Brookfield	48	-6	24.8	3.69
Lancaster	49	-14	19.7	2.13	Cherry Creek				4.15
Littleton	48	-12	17.2	2.76	Constableville †	46	-6	22.3	...
Nashua	53	-3	24.5	2.84	Cooperstown †	50	-4	25.5	2.84
Newton	55	-8	24.2	2.07	Cortland				2.75
North Conway	51	-12	18.6	2.00	De Kalb Junction				2.95
Peterboro	48	-6	23.0	2.58	Demster				3.55
Plymouth	45	-12	17.0	2.01	Deposit				1.35
Amherston †	45	-8	20.4	1.82	Eden Center	50	5	26.1	4.65
Stratford	46	-18	17.8	2.56	Ellis				2.15
Wiers Bridge				3.19	Elmira * †	56	7	32.6	2.73
West Milan	47	-24	14.8	3.35	Factoryville †	60	7	30.4	2.39
Wolfboro				2.02	Fleming	54	10	29.9	1.80
New Jersey.					Fort Niagara †	51	16	33.2	1.70
Allaire	59	10	34.8	...	Friendship	54	-9	29.2	4.26
Bayshore Park	55	17	35.6	1.76	Glens Falls	44*	3*	22.8	...
Barnegat	60	21	39.4	2.55	Gloversville	47	-2	23.2	3.27
Bayonne	60	15	33.6	2.36	Hess Road St'n 12		14	30.0	1.72
Belvidere	56	7	32.3	2.40	Honeymead Brook †	49*	2	26.9	2.23
Beverly †	59	12	35.2	2.27	Humphrey †	57	3	30.0	4.41
Billingsport *	56	16	34.8	2.24	Ithaca	58	5	30.2	2.78
Blairstown	53	5	31.4	1.18	Jamestown **	51	7	31.9	...
Bloomton	58	11	33.1	2.54	Kings Station				3.06
Bridgeton	57	20	38.8	3.68	Lebanon Springs	52	-4	24.1	3.43
Camden	58	16	34.9	1.98	Le Roy	53	5	28.1	4.91
Cape May C. H.	53	13	38.8	2.52	Lockport	50	6	28.9	3.13
Cape May	53	19	39.1	2.12	Lowville	47	-6	23.1	3.51
Charlotteburg	57	3	29.7	2.16	Lyons	56	12	31.0	2.45
Chester	56	9	30.5	2.47	Madison Barracks †	49	0	24.8	3.16
Chesterstown	55	9	29.4	2.63	Malone	48	-6	20.1	2.48
Clover	58	8	30.9	2.99	Middletown	54	10	28.9	2.08
Cogg Harbor City	57	16	35.0	2.92	Minnewaska	50	5	26.9	1.96
Elizabeth	61	13	33.8	2.23	Mount Morris	57	1	29.7	2.58
Franklin Furnace	57	7	29.2	2.09	Newark Valley				2.45
Franklinville	57	8	35.2	2.67	New Lisbon	52	-6	25.8	2.13
Frehold	60	16	35.2	2.53	North Hammond †	52	-2	24.0	2.80
Friesburg				2.51	Number Four †	44	-11	21.5	3.87
Gillette.	60	9	31.5	2.32	Ogdensburg	51	-4	20.5	5.65
Hanover	51	7	32.0	2.04	Oxford	52	1	27.4	2.85
Highland Park †	59	10	32.2	2.22	Palermo †	54	-4	25.3	3.40
Hightstown	58	17	35.6	2.97	Perry City	55	7	27.5	3.13
Hillstown.				1.96	Phonix				2.31
Hunton				1.96	Pine City				2.19
Humbertville	58	9	33.2	1.58	Plattsburg B'ks	50	-8	19.2	2.04
Hillville	57	16	37.6	2.55	Port Jervis	52	3	28.8	2.47
Hooresstown	58	15	35.0	2.32	Poughkeepsie	52	-2	27.8	2.48
Hewark *	57	15	32.6	2.19	Rome	50	5	25.4	3.77
Hewark †	58	15	33.2	1.92	Romulus	57	10	30.0	1.94

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
New York—Cont'd.	°	°	°	Ins.	Ohio—Cont'd.	°	°	°	Ins.
Rondout f.	44	-13	19.9	1.50	Athens.	61	-1	37.2	2.70
Saranac Lake.	44	-13	19.9	2.77	Auburn.	54	-3	30.2	2.43
Setauket f.	35	16	33.6	3.03	Bangorville.	56	-9	31.7	2.69
South Canisteo.	47	-7	25.6	3.41	Batavia.	57	-10	31.6	2.52
South Kortright f.	51	-4	23.5	2.28	Bellefontaine f.	56	-10	31.6	0.94
Stillwater.	50	-4	23.5	3.23	Bement.	52	0	29.3	3.33
Turin.	46	-5	22.1	3.81	Benton Ridge.	59	-8	33.1	2.07
Varysburg.	59	4	30.0	3.19	Bethany.	58	-7	34.6	2.57
Wappingers Falls.	58	3	28.5	2.45	Big Prairie.	56	-2	33.2	2.37
Warwick.	51	-3	25.3	3.79	Binola.	55	3	34.3	2.68
Watertown.	57	-3	25.3	3.92	Bissells.	53	3	30.5	2.67
Wedgwood.	57	-3	25.3	3.10	Bladensburg.	57	-4	32.4	2.52
West Chazy.	57	-3	25.3	3.66	Bloomington.	59	-7	35.7	2.19
West Point f.	52	9	30.5	3.15	Bloomington.	59	-7	35.7	2.19
Willetta Point.	50	13	32.2	3.03	Howling Green.	57	-6	30.8	1.66
North Carolina.					Bucyrus.	60	-6	31.6	1.60
Asheville f.	68	17	42.4	2.44	Caledonia f.	57	3	33.2	2.20
Auburn *1.	73	27	44.5	4.28	Cambridge.	57	3	33.2	2.20
Bailey *1.	63	22	42.9	2.86	Canal Dover.	56	2	32.3	2.29
Bakersville f.	60	13	39.0	3.57	Cardington.	57	-7	32.3	1.99
Blowing Rock f.	60	11	35.6	3.81	Carrollton.	55	-4	34.0	3.00
Bryson City f.	68	24	43.6	4.30	Celina.	65	-4	37.6	1.51
Chapel Hill f.	68	11	41.4	3.10	Cherry Fork.	60	0	35.7	2.46
Columbus.	68	11	41.4	3.10	Chicago.	50	-4	28.0	1.85
Currituck Inlet f.	67	25	44.4	4.52	Circleville f.	59	-9	35.2	2.87
Experiment Farm.	67	25	44.4	4.52	Clarksville.	59	-9	35.2	2.87
Fair Bluff f.	69	27	46.8	4.56	Cleveland.	54	5	33.8	2.83
Fayetteville f.	65	16	40.3	3.96	Coalton.	60	-4	35.9	2.12
Flat Rock.	61	20	41.3	1.45	Colebrook.	61	2	37.1	2.55
Forest Hill *1.	61	20	41.3	1.45	Cynthiana.	61	0	37.1	2.55
Greenville f.	67	21	42.8	4.15	Dayton a f.	59	-6	35.8	2.27
Henderson f.	59	16	38.4	5.70	Dayton b f.	59	-6	35.8	2.27
Hillsdale.	62	21	41.7	6.00	Debauch.	59	-5	32.7	1.77
Horse Cove f.	62	20	41.3	2.61	Demo.	56	3	34.9	2.22
Lenoir *1.	62	20	41.3	2.61	Dupont.	59	-5	32.7	1.55
Lillington f.	67	23	41.6	4.12	Ellsworth.	56	4	30.7	2.38
Littleton f.	67	23	41.6	4.12	Elyria.	54	-2	33.4	2.71
Louisburg f.	65	24	42.0	3.55	Findlay.	55	-6	31.9	1.87
Marion.	64	19	43.2	2.33	Forstoria.	56	-6	32.6	2.17
May *1.	66	27	46.1	4.07	Frankfort.	61	-2	36.0	2.40
McKeesville f.	68	19	44.8	2.87	Garrettsville.	55	3	30.4	2.49
Morgantown *1.	66	19	42.8	3.71	Georgetown.	63	-6	37.5	2.96
Mount Airy f.	61	15	41.3	2.78	Granville.	57	-5	32.7	2.62
Mount Pleasant.	64	22	44.4	3.67	Gratiot.	58	-1	34.7	2.27
Murphy f.	64	22	44.4	3.67	Greenfield.	60	4	37.5	3.60
Newbern f.	74	26	46.4	3.93	Green Hill.	56	0	31.4	2.06
Oak Ridge f.	65	22	41.3	3.10	Greenville.	55	-8	33.1	1.66
Pittsburg.	65	19	41.2	4.95	Guyville.	62	-3	36.2	2.19
Raleigh *1.	65	25	45.2	4.45	Hackney.	59	-1	34.4	1.82
Rockingham f.	70	23	45.1	3.42	Hamlet.	63	-4	37.2	2.87
Roxboro f.	68	18	42.4	4.39	Harbor.	54	-7	32.5	2.15
Rutherford Co. *1.	68	18	42.4	4.39	Hedges.	58	-7	31.2	2.56
Salisbury a.	63	25	45.0	3.05	Hillhouse.	53	-5	30.5	2.31
Salisbury b f.	66	15	40.4	3.34	Hillsboro.	63	-8	37.0	2.05
Saxon f.	66	15	40.4	3.34	Hiram.	54	-2	30.2	2.70
Shelby f.	65	20	42.3	4.62	Jacksonboro *1.	57	-8	30.6	1.45
Sloan.	73	24	48.6	4.79	Kenton f.	58	-8	33.7	2.07
Smithfield.	62	20	43.0	2.20	Kilbourne.	57	-4	32.4	1.37
Soapstone M f.	66	18	42.4	3.90	Killbuck.	55	-2	32.5	2.09
Southern Pine f.	70	26	45.7	3.33	Levering.	63	-7	31.8	2.05
Tarboro.	72	23	45.6	4.93	Logan.	60	-1	36.4	2.20
Washington f.	73	24	46.7	3.72	Lordstown.	54	6	31.5	2.24
Weldon f.	67	24	42.8	4.05	Lowell.	64	-1	36.1	2.07
Wilmington.	68	23	43.7	4.39	McArthur.	58	-3	35.8	1.37
North Dakota.					McConnellsville.	59	-1	35.6	2.19
Ashley.	40	-39	1.0	0.80	Mansfield f.	57	-2	35.6	2.19
Berlin f.	48	-30	0.4	0.45	Marietta a f.	62	-7	39.5	2.44
Bottineau.	40	-37	-0.11	0.11	Marietta b.	62	-7	39.5	2.44
Churches Ferry.	38	-34	-2.8	0.42	Marion.	58	-9	33.0	2.35
Dickinson f.	52	-39	-5.0	0.12	Marionville.	56	3	31.1	1.91
Fargo f.	38	-38	-2.6	0.09	Milligan.	59	0	34.9	2.04
Forman f.	40	-35	-3.1	0.58	Millport.	55	9	33.3	2.37
Fort Berthold.	51	-41	-5.4	0.30	Montpelier.	53	-6	29.7	1.36
Fort Stevenson.	41	-39	-1.6	0.30	Napoleon.	56	-4	31.0	2.05
Fort Yates.	42	-31	-4.3	0.48	Nelsonville.	62	5	39.8	2.13
Gallatin f.	43	-42	-2.6	0.06	New Alexandria.	55	4	34.0	2.22
Grafton f.	43	-42	-2.6	0.06	New Berlin.	51	-2	31.2	1.62
Grand Forks f.	41	-30	-0.2	0.61	New Bremen.	57	-9	32.3	1.77
Jamestown f.	42	-30	-3.4	0.34	New Comerstown.	56	3	33.3	2.35
Kelso f.	45	-34	-0.6	0.35	New Holland.	62	-8	34.2	2.31
Larimore.	42	-36	-0.9	0.20	New Paris *1.	57	-11	33.4	1.81
Lemert f.	46	-36	-1.2	0.25	North Lewisburg.	58	-9	32.4	2.05
McKinney.	41	-38	-1.4	0.70	North Royalton.	60	-9	34.5	1.98
Milton f.	40	-39	-1.5	1.30	Oberlin.	54	-3	32.6	2.08
Minto f.	42	-35	-1.5	0.25	O. S. University.	63	-6	33.8	2.50
Napoleon f.	37	-33	-1.9	0.79	Orangeville.	56	-1	31.2	2.20
New Salem.	60	-35	-0.9	0.20	Pataaskala.	58	-7	33.4	2.58
Oakdale f.	52	-31	-1.3	0.13	Plattsburg.	57	-8	33.7	2.00
Portal.	49	-36	-0.5	0.51	Pomeroy.	62	-2	36.2	0.60
Power f.	37	-33	-2.8	0.60	Portsmouth a f.	65	-1	40.4	1.91
Saint John f.	48	-34	-0.7	1.19	Portsmouth b.	65	-1	40.4	1.91
Shenandoah.	40	-38	-0.9	0.20	Ridge.	54	-2	34.3	1.80
Valley City f.	40	-38	-0.9	0.20	Ridgeville Corners.	57	-5	31.1	0.99
Wahpeton f.	48	-30	-5.9	0.35	Ritman.	62	-5	36.7	1.46
Washburn.	49	-36	-3.1	0.09	Rush Creek.	53	0	31.3	2.00
Wild Rice f.	41	-39	-1.6	0.40	Sharon Center.	55	9	34.3	2.13
Williamsport.	47	-47	-3.5	0.34	Shenandoah.	55	-8	31.9	2.19
Willow City f.	47	-47	-3.5	0.34	Sidney f.	57	-1	31.9	1.83
Woodbridge f.	40	-38	-4.5	0.34	Springboro.	50	-16	27.1	1.74
Ohio.					Spring Valley.	50	-16	27.1	1.74
Akron.	54	4	33.2	2.30	Stoutsville.	50	-16	27.1	1.74
Annapolis.	66	7	32.4	1.84	Sylvania.	55	2	29.5	0.74
Annecum.	58	-2	32.2	2.43	Thurman.	64	-4	37.4	1.63

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Ohio—Cont'd.	°	°	°	Ins.	Pennsylvania—Con.	°	°	°	Ins.
Tiffin f.	56	-2	33.4	2.12	Clarion f.	55	6	33.2	4.19
Upper Sandusky.	55	-4	32.7	1.81	Conesville.	55	6	33.2	2.25
Vanceburg.	54	-3	38.2	2.27	Confluence.	55	6	33.2	3.15
Van Wert.	54	-7	31.1	1.54	Coopersburg.	55	13	34.0	1.69
Vermillion.	53	-1	31.7	2.33	Davis Island Dam f.	55	13	34.0	1.58
Vicksburg.	56	-1	32.3	1.81	Doylestown.	55	13	34.0	1.72
Walnut.	56	-1	32.3	1.81	Drifton.	60	3	30.3	2.68
Warren.	58	4	32.7	2.65	Du Bois f.	53	2	26.6	3.52
Wauseon.	56	-6	30.5	2.27	Dyberry f.	53	2	26.6	1.95
Waverly.	62	-3	36.4	1.85	East Mauch Chunk.	56	10	31.2	2.17
Waynesville.	54	-1	32.7	2.53	Easton.	55	13	32.6	1.88
Wellington.	57	-4	34.3	2.34	Edinboro *1.	59	4	29.5	2.24
Westerville.	59	0	34.9	1.86	Elwood Junction f.	57	3	32.1	3.85
Weymouth.	59	0	34.9	1.86	Emporium.	57	3	32.1	3.85
Wheeler f.	56	1	32.8	2.19	Fks of Nesheim *1.	57	3	32.1	1.82
Wooster a.	56	1	32.8	2.19	Frederick.	57	3	32.1	1.82
Wooster b f.	56	1	32.8	2.19	Freeport f.	57	3	32.1	1.82
Youngstown.	53	4	31.2	1.81	Gettysburg f.	57	3	32.1	1.82
Zanesville f.	53	4	31.2	1.81	Girardville.	53	12	33.4	2.76
Okahoma Ter.					Grampian *1.	54	4	30.2	3.15
Anadarko f.	77	-6	38.6	1.86	Greensboro f.	53	12	33.2	2.22
Arapahoe f.	80	-6	36.4	0.78	Hamburg.	53	12	33.2	2.22
Buffalo.	80	-6	36.4	0.78	Hollidaysburg.	61	9	34.4	2.07
Burnett f.	78	-12	37.9	3.91	Honesdale.	54	0	29.4	2.01
Clifton f.	78	-15	35.2	3.35	Huntingdon f.	62	11	33.6	1.80
Fort Reno f.	75	-5	37.7	1.70	Johnstown f.	59	8	34.4	3.00
Fort Sill.	75	-5	37.7	1.70	Kane.	59	4	29.2	4.71
Fort Supply f.	75	-5	37.7	1.70	Kennett Square.	57	8	34.8	1.78
Guthrie f.	74	-8	37.2	2.20	Kilmer *1.	59	18	36.2	1.60
Keokuk Falls f.	74	-8	37.1	3.08	Lancaster f.	55	15	33.9	1.57
Mangan f.	72	-7	34.2	2.15	Lansdale.	54	10	32.6	2.17
Ponca f.	72	-7	34.2	2.15	Lebanon.	54	10	32.6	2.17
Pond Creek f.	74	-8	33.1	1.74	Le Roy f.	55	5	28.3	2.43
Winview f.	72	-8	37.8	1.40	Lewisburg.	59	11	32.2	2.84
Oregon.					Ligonier.	60	2	32.5	1.74

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>S. Carolina—Cont'd.</i>					<i>Texas—Cont'd.</i>				
McCormick *†1	69	26	48.1	4.36	Childress†	82	—1	41.0	0.38
Martins	...	...	...	1.23	Coldwater†	74	—10	31.5	0.13
Mount Carmel†	...	...	...	3.44	College Station	77	10	52.9	3.54
Pinopolis *†1	70	32	49.7	1.87	Columbia†	79	19	57.5	0.79
Port Royal†	73	30	53.5	1.19	Corsicana†	75	—2	47.5	1.96
Saint Stephens†	...	...	...	2.07	Cuero†	80	18	57.4	4.18
Santuck†	67	26	46.8	3.77	Dallas†	79	2	45.9	1.79
Simpsonville†	60	26	46.0	4.76	Devine	79	16	52.2	0.61
Society Hill†	74	27	47.3	2.50	Duval *†1	82	13	54.1	1.20
Statesburg†	74	29	49.2	2.27	Eagle Pass†	...	...	...	0.40
Tatum Station *†1	...	...	...	4.31	Eastland *†1	79	4	47.1	0.50
Timmonsville *†1	77	35	53.6	...	Flower Bluff†	76	27	60.8	1.39
Trenton†	72	28	48.4	2.37	Forestburg†	78	0	45.3	1.41
Trials	80	29	54.5	2.02	Fort Brown†	83	31	61.0	1.64
Watts *†1	64	22	47.1	3.82	Fort Clark	78	20	54.6	1.32
Yorkville	67	26	46.8	2.84	Fort Hancock	75	4	37.2	0.00
<i>South Dakota.</i>					Fort McIntosh	84	15	59.6	0.72
Alexandria†	52	—34	8.2	1.02	Fort Ringgold†	86	32	62.4	1.50
Ashcroft†	50	—30	11.8	0.85	Fredericksburg *†1	79	11	49.5	2.00
Bowdle *†1	45	—31	4.9	0.40	Gainesville†	81	0	43.4	2.19
Britton†	41	—36	1.6	0.50	Graham†	80	3	43.3	1.81
Brookings†	49	—33	5.8	0.11	Grape Vine†	80	3	46.6	1.30
Castlewood†	39	—36	3.4	0.63	Hallettsville†	79	18	54.8	5.30
Clark†	48	—33	6.9	...	Haskell†	83	5	43.6	0.78
Cross†	57	—31	18.8	0.39	Highland	90	5	48.5	0.30
De Smet†	50	—35	5.6	1.10	Houston†	79	18	54.1	3.59
Faulkton†	43	—35	3.0	0.30	Kyle *†1	74	18	54.5	2.56
Flandreau†	42	—33	7.2	0.51	Laredo†	...	...	...	0.16
Forestburg†	41	—39	6.1	1.27	Llano *†1	80	10	50.3	0.09
Fort Meade	60	—24	19.6	0.55	Longview†	78	7	50.8	4.44
Fort Sully	53	—26	13.5	0.75	Luling†	78	16	55.6	1.94
Frankfort†	41	—39	3.2	0.70	McGregor†	65	7	35.6	1.15
Gary†	43	—28	6.0	0.40	Marshall†	76	8	51.6	4.30
Greenwood	50	—27	14.0	0.69	Menardville *†1	80	7	47.9	0.31
Highmore†	43	—32	7.4	0.45	Mountain Spring†	80	0	46.8	1.17
Hotch City†	45	—38	9.0	0.42	New Braunfels†	78	16	53.1	0.93
Howard†	39	—36	4.9	0.90	Orange†	76	22	56.3	3.69
Kimball†	45	—32	9.1	0.68	Panther *†1	80	5	48.3	1.42
Millbank†	51	—29	6.8	0.65	Rio Grande City†	...	...	...	0.39
Northville *†1	40	—35	3.4	0.57	Ruby†	78	2	45.1	0.42
Oelrichs†	48	—22	16.0	1.70	Rockport *†1	76	24	56.1	...
Parker†	39	—34	6.4	0.45	Round Rock†	82	12	52.7	2.02
Parkston†	42	—38	5.8	0.44	San Antonio	79	16	54.7	1.25
Piedmont	...	...	...	0.36	San Marcos†	...	...	...	1.41
Rosebud†	56	—33	17.8	1.50	Silver Falls†	80	4	41.6	0.05
Shiloh†	47	—33	8.5	...	Sulphur Springs†	80	2	47.0	2.39
Sioux Falls†	40	—32	8.4	1.09	Temple†	78	5	47.2	1.71
Spears†	61	—22	21.1	1.62	Victoria *†1	80	18	55.0	3.00
Tyndall†	53	—28	11.4	1.10	Waco†	79	6	49.6	2.00
Vermillion†	54	—33	8.8	0.13	Weatherford†	79	2	46.0	0.93
Watertown†	40	—33	6.0	1.23	Wichita Falls†	86	—10	44.4	1.38
Webster†	46	—30	6.3	1.92					
Westworth†	41	—35	3.4	0.35	<i>Utah.</i>				
Wessington Spgs†	43	—28	8.4	1.38	Blue Creek *†1	45	—10	23.6	0.70
<i>Tennessee.</i>					Castle Gate†	40	—5	19.2	0.67
Andersonville *†1	59	8	39.0	2.69	Cisco†	48	—10	22.3	0.30
Ashwood *†1	65	0	44.3	5.54	Corinne *†1	48	3	27.4	1.15
Byrdstown *†1	67	—1	42.6	3.55	Dearet†	46	—7	23.8	0.35
Carthage†	...	...	...	4.36	Fillmore†	58	—16	25.4	0.70
Charleston†	...	...	...	5.21	Fort Du Chesne†	31	—24	8.1	0.08
Clarksville	69	—6	41.3	3.51	Grouse Creek *†1	43	—7	21.1	2.87
Clinton†	...	...	...	4.21	Heber†	50	—21	17.2	3.65
Columbia†	...	...	...	5.24	Kelton *†1	50	—1	27.6	1.70
Covington†	69	0	43.0	4.08	Koosharem	41	—16	13.1	0.17
Florence Station *†1	66	1	43.4	5.04	Lake Park	48	—8	26.2	0.91
Franklin†	69	—3	42.3	4.76	Levan†	...	...	...	22.8
Greenville†	63	16	42.2	3.21	Loa†	48	—17	20.0	0.13
Hohenwald	68	—4	43.0	5.28	Logan†	45	—4	24.3	1.86
Jacksboro *†1	68	8	38.8	3.25	Losee†	44	—15	19.8	0.30
Jackson *†1	68	—3	42.3	3.35	Manti†	50	—10	23.2	1.20
Johnson City†	65	10	41.6	3.06	Moab†	48	—1	28.0	0.33
Johnsonville†	...	...	...	3.36	Ogden *†1	43	2	28.6	3.08
Kingston†	...	...	...	4.80	Ogden *†1	49	5	29.4	2.48
Loudon†	...	...	...	7.12	Parowan†	50	—7	25.1	1.65
Lynnville *†1	66	2	43.0	...	Promontory *†1	52	—15	23.5	0.75
Missionary Ridge *†1	68	13	43.1	4.62	Provo City†	...	...	...	22.8
Newport *†1	68	19	38.6	4.62	Randolph†	44	—8	17.4	0.20
Nunnely *†1	68	—4	43.2	4.49	Richfield†	48	—3	24.4	0.95
Palmetto†	...	...	...	5.90	Saint George†	63	8	33.6	0.21
Parksville *†1	65	18	45.6	4.06	Silver Lake *†1	40	—14	15.2	6.60
Pikeville *†1	65	16	45.6	4.38	Singletree *†1	46	—5	22.8	...
Riddleton†	65	0	39.4	3.07	Snowville†	42	—15	23.0	2.20
Rockwood†	...	...	...	4.54	Soldier Summit	30	—15	11.1	3.55
Rogersville *†1	60	17	40.0	2.92	Terrace *†1	46	8	28.9	0.85
Rugby *†1	62	4	39.6	4.20	Thistle†	48	—12	22.0	1.60
Savannah *†1	71	1	45.9	4.57	<i>Vermont.</i>				
Springdale *†1	66	12	42.6	2.95	Brattleboro	47	—1	24.6	1.85
Strawberry Plains†	...	...	...	1.83	Burlington†	46	—3	22.7	1.30
Trenton	69	—3	41.2	3.99	Cornwall	47	—12	20.4	2.53
Waynesboro *†1	66	0	42.1	7.20	Enosburg Falls†	47	—13	19.7	2.45
Wier *†1	66	—2	41.7	4.67	Hartland†	47	—7	19.4	2.57
<i>Texas.</i>					Irasburg†	46	—14	16.0	4.10
Arlington†	81	3	47.5	1.98	Jacksonville	44	—8	17.9	2.87
Arthur City†	...	...	...	0.73	Norwich *†1	46	—6	20.1	2.49
Aurora *†1	83	2	47.5	0.49	Simonsville	42	—10	17.4	...
Austina†	79	15	53.1	1.45	Stratford *†1	42	—10	25.1	3.45
Austin *†1	79	14	52.9	...	Vernon *†1	44	—5	21.6	2.68
Belton	79	9	52.0	2.05	Wells	54	—10	21.5	1.96
Boerne *†1	75	—9	49.4	1.68	Woodstock	49	—10	19.8	2.71
Brady†	82	5	49.2	0.49	<i>Virginia.</i>				
Brasoria†	80	20	57.8	2.51	Abingdon†	...	...	...	3.25
Brenham†	78	12	55.0	4.86	Alexandria	57	19	38.2	2.02
Brownwood†	80	5	46.7	0.27	Ashland†	63	18	42.0	2.43
Burnet *†1	73	4	51.3	1.42	Avon†	73	11	41.2	1.76
Camp Eagle Pass	87	20	52.4	0.39	Bedford City†	63	18	40.8	2.73

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Virginia—Cont'd.</i>					<i>W. Virginia—Cont'd.</i>				
Birdsneat *†1	62	27	42.3	3.86	Raleigh†	61	3	35.4	0.83
Blacksburg	62	13	36.6	1.69	Rowlesburg†	...	...	...	2.63
Buchanan†	...	...	...	1.57	Sandyville *†1	62	—4	35.6	2.28
Cape Charles†	58 ^o	25 ^o	42.4 ^o	3.03	Spencer†	65	—2	39.2	2.46
Christiansburg†	...	...	...	1.63	Tannery *†1	60	10	35.8	...
Clarksville†	...	...	...	2.96	Weston a†	...	...	...	2.60
Dale Enterprise†	62	10	36.4	1.16	Weston b†1	60	10	38.6	...
Danville†	...	...	...	2.61	Wheeling a†	...	...	...	1.43
Falls Church†	...	...	...	1.88	Wheeling b†	63	12	39.4	1.93
Fredericksburg†	62	18	39.7	1.17	<i>Wisconsin.</i>				
Hampton	63	26	43.2	3.06	Amherst	44	—22	15.6	1.22
Hot Springs	61	10	35.6	1.10	Ashland†	56	—30	19.6	0.90
Irwin†	61	18	40.0	2.52	Baraboo†	56	—23	21.0	1.77
Lexington†	64	12	37.0	1.55	Barron†	43	—42	8.8	1.68
Marion†	64	15	38.2	2.85	Bayfield	45	—22	14.8	1.28
Nottoway	67	18	41.2	3.22	Beaver Dam	55	—19	21.7	1.47
Petersburg†	68	22	42.9	3.06	Belleville	57	—27	20.2	1.10
Richmond a†	64	19	40.0	3.42	Beloit	58	—21	23.5	1.82
Richmond b†	...	...	...	3.30	Black River Falls†	48	—29	13.9	1.02
Riverton†	...	...	...	1.16	Butternut†	43	—41	7.4	0.77
Salem†	65	22	42.1	1.61	Cadiz *†	...	...	...	2.45
Saluda†	66	18	42.8	2.02	Centralia	47	—26	16.8	1.92
Spottsville†	63	20	41.0	2.99	Chilton	51	—19	20.0	2.35
Standardsville†	63	18	38.8	2.79	Chippewa Falls†	...	...	...	1.22
Staunton†	66	14	39.8	1.21	City Point	45	—34	13.9	1.56
Stephens City†	64	12	38.0	0.94	Columbus	55	—20	20.0	1.65
Warsaw†	63 ^o	18 ^o	39.4 ^o	1.98	Crandon†	47	—33	14.3	1.80
Woodstock†	...	...	...	1.17	Delavan (near)†	55	—23	23.4	1.09
Wytheville†	59	13	36.9	2.03	Eau Claire	41	—30	11.4	1.30
<i>Washington.</i>					Estellat†	44	—36	10.8	1.73
Aberdeen†	59*	27	40.8	17.17	Florence†	55	—24	14.8	1.50
Anacortes	...	...	...	5.82	Fond du Lac†	53	—21	19.4	1.61
Blaine†	54	12	33.8	5.77	Grantsburg†	49	—36	11.2	1.40
Bridgeport†	56	4	27.6	0.12	Hartford *†	...	...	...	2.31
Chehalis†	58	17	38.0	8.27	Harvey†	57	—21	20.8	1.32
Colfax†	48	—1	28.3	5.70	Hayward†	43	—41	7.5	1.30
Connell†	58	—1	32.4	1.38	Hillaboro	35	—20	17.4	1.57
Crystal Springs *†1	62	28	43.6	...	Janesville	56	—4	23.0	1.30
Dayton†	58	5	33.4	5.49	Juneau†	54	—20	21.8	1.81
East Sound†	58	23	37.8	5.23	Koepnick *†1	64	—24	16.1	1.00
Elbe	...	...	...	13.37	Lancaster†	55	—24	17.8	0.87
Ellensburg†	45	0	25.0	1.21	Lincoln†	...	...	...	1.52
Ferry†	54	18	37.6	9.81	Madison†	54	—18	20.6	0.92
Fort Simcoe	49	9	29.2	1.45	Manitowoc†	46	—13	21.3	1.55
Fort Spokane	51	—3	24.2	2.74	Meadow Valley†	48	—28	15.8	1.24
Fort Townsend	55	20	37.7	4.53	Medford†	...	...	...	3.00
Hunters *†1	41	—10	19.8	3.37	Medford b†	48	—38	11.4	1.10
Lakeside†	50	5	24.6	1.08	Menomonie	46	—40	6.4	1.25
Lapush†	67	22	42.4	13.22	Neillville†	46	—30	13.3	1.87
Madrone *†1	58	19	38.9	6.41	New Holstein†	44	—18	18.8	1.68
Moxee Valley†	59	0	30.8	1.10	Oconomowoc†	56	—19	22.2	1.52
Olga†	54	23	38.8	4.34	Oconto	46	—15	18.8	2.32
Pine Hill *†1	53	19	35.2	6.66	Oscola†	44	—42	7.8	0.97
Pomeroy†	52	10	33.4	5.06	Oshkosh†	49	—17	20.6	1.10
Pullman†	44	0	26.2	3.33	Pepin	44	—29	11.7	0.78
Rosalia†	46	—14	25.1	4.22	Portage†	54	—15	22.8	1.43
Silver Creek *†1	55	18	38.8	10.52	Port Washington	59	—25	20.0	0.78
Stillaquamish†	...	...	...	5.68	Prairie du Chien	59	—28	20.7	1.86
Tacoma†	57	19	38.4	7.00	Raymond	50	—16	23.7	1.05
Union City *†1	52	20	37.3	13.45	Reedsburg†	56	—22	20.7	1.05
Vashon†	53	12	33.6	9.70	Sharon†	56	—19	22.9	1.97
Waterville†	48	—6	20.0	1.48	Shawano	47	—24	18.0	2.04
West Ferndale	54	17	35.0	6.84	Stevens Point†	43	—32	15.6	0.89
<i>West Virginia.</i>					Valley Junction†	53	—30	16.4	0.97
Beverly†	62	8	39.0	4.23	Viroqua	52	—22	16.6	1.23
Bloomery†	58	8	33.4	1.15	Waukesha *†	...	...	...	1.34
Bluefield†	62	8	35.7	2.60	Westfield†	51	—21	18.0	2.10
Buckhannon a†	...	...	...	3.28	Weston *†2	...	...	...	2.32
Buckhannon b†	63	5	34.1	...	Whitehall†	48	—38	12.2	...
Burlington†	65	8	36.5	1.20	<i>Wyoming.</i>				
Central Station†	64	4	37.5	4.09	Big Horn Ranch†	50	—28	20.2	0.28
Charleston†	...	...	...	2.35	Camp Pilot Butte	44	—10	17.6	0.16
Davis†	70	4	34.7	3.37	Fort McKinney	56	—26	20.6	0.30
Elkhorn†	65	12	40.4	2.62	Fort Washakie	52	—20	20.6	0.09
Ella†	50	4	34.7	2.49	Fort Yellowstone†	43	—25	17.2	1.82
Fairmont†	...	...	...	2.03	Lander	50	—15	21.4	0.40
Glenville†	61	6	36.4	2.48	Laramie	54	—25	19.9	0.03
Grafton†	62	9	37.0	2.51	Saratoga†	52	—20	18.2	0.60
Harpers Ferry†	...	...	...	0.78	Sheridan	50	—36	12.4	0.70
Hinton†	...	...	...	1.82	Sundance	46	—28	13.0	1.10
Huntington†	63	1	37.8	...	Wheatland†	68	—22	25.8	0.50
Marlinton†	61	6	33.1	1.81	<i>Canada.</i>				
Martinsburg†	65	16	37.1	0.87	Fort Francis, Ont.	50	—46	0.6	0.72
Monarch†	60 ^a	12 ^d	39.3 ^d	2.16	<i>Mexico.</i>				
Morgantown a†	...	...	...	2.45	Ciudad Porfirio Diaz	83	26	57.1	0.36
Morgantown b†	65	10	34.8	...	Mazatlan	74	55	64.2	0.15
New Martinsville†	66	7	37.9	2.48	Topolobampo *†	76	50	57.8	0.26
Parkersburg†	63	4	37.0	1.33	<i>New Brunswick.</i>				
Phillippi†	...	...	...	1.90	St. John's	45	—10	18.3	3.15
Pleasant Hill *†1	58	0	32.6	5.71	<i>West Indies.</i>				
Point Pleasant†	66	2	39.1	1.32	Grand Turk Island.	...	...	...	0.79
					Hamilton, Bermuda	72	53	64.2	5.94

Reports received too late, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Kansas—Cont'd.</i>	°	°	°	<i>Ins.</i>	<i>Oregon.</i>	°	°	°	<i>Ins.</i>
Wa Keeney *1.....	64	-12	29.8	0.20	Aurora (near).....	58	19	39.8	14.90
Wallace *2.....	70	.....	28.8	0.20	Forest Grove.....	59	19	37.4	11.63
Winona *3.....	70	-12	23.9	0.16	Happy Valley †.....	51	1	30.1	1.72
<i>Mississippi.</i>					La Grande †.....	50	8	30.6	3.34
Enterprise.....	74	13	49.6	3.42	Lakeview †.....	51	1	24.9	4.66
University †.....	71	4	48.6	4.67	Vernonia *1.....	52	16	38.1	13.98
<i>New York.</i>					<i>Wisconsin.</i>				
Potadam.....	47	-8	18.4	2.16	Sheboygan *2.....	48	-21	20.7	.....
<i>Oklahoma Territory.</i>									
Stillwater †.....	81	-8	35.8	4.01					

Received too late for publication in December, 1893.

<i>California.</i>					<i>Iowa—Cont'd.</i>				
Covelo.....				6.52	Spirit Lake †.....	47	-21	15.6	1.44
Guinda.....				1.00	<i>Kansas.</i>				
Jolon.....				2.31	Topeka.....	68	2	34.4	0.35
Mountain View.....				1.48	<i>New Mexico.</i>				
Point George.....				3.07	Lordsburg *2.....	65	21	46.3	0.05
<i>Colorado.</i>					<i>Texas.</i>				
Kirk.....				0.10	Corsicana †.....	76	23 ^d	53.3 ^d	0.20
Manhattan.....				1.36	San Antonio.....	82	29	57.8	0.77
<i>Georgia.</i>					<i>Utah.</i>				
Thomasville †.....	76	29	56.5	7.02	Fort Du Chesne †.....	55	-6	30.4	0.49
<i>Iowa.</i>					Logan.....	54	11	33.6	1.44
Cedar Falls.....	52	-12	19.2	1.00	Soldiers Summit †.....	45	-16	21.2	1.19
Council Bluffs.....	58	-4	26.1	0.22	<i>Mexico.</i>				
Knoxville.....	58	-8	21.7	1.90	Vera Cruz.....	81	61	70.7	2.95

*Extremes of temperature from observed readings of dry thermometer.

† Weather Bureau instruments.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

1 Mean of 7 a. m. + 2 p. m. + 9 p. m. + 4.

2 Mean of 5 a. m. + 8 p. m. + 2.

3 Mean of 7 a. m. + 7 p. m. + 2.

4 Mean of 6 a. m. + 6 p. m. + 2.

5 Mean of 7 a. m. + 2 p. m. + 2.

6 Mean from readings at various hours reduced to true daily mean by special tables.

7 Mean from hourly readings of thermograph.

8 Mean of 7 a. m. + 2 p. m. + 9 p. m. + 3.

9 Mean of sunrise and noon.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston a," "Livingston b," indicates that two or more observers, as the case may be, are reporting from the same station. A small Roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "a" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.

Corrections: California, Florence, strike out all precipitation data from May to November, inclusive, 1893; Spadra, strike out all precipitation data from May, 1892, to December, 1893, inclusive; Byron, June, 1893, make mean temperature 71.7 instead of 68.3. Kansas, Washington, December, 1893, add mean temperature 32.0.

TABLE III—Data from Canadian stations for the month of January, 1894.

Station.	Pressure.			Temperature.		Precipitation.		Prevailing direction of wind.
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.	
	Inches.	Inches.	Inches.	°	°	Inches.	Inches.	
Saint Johns, N. F.....	29.92	29.98	+ .06	20.5	+ 1.0	2.32	- 2.49	nw.
Sydney, N. S.....	29.92	30.06	+ .10	22.0	+ 1.0	7.32	+ 1.63	n.
Grindstone, G. S. L.....	30.02	30.07	.....	23.7	- 0.2	3.01	- 2.36	w.
Sandy Point, N. F.....	29.99	30.07	+ .05	25.3	- 0.2	3.84	- 1.38	n.
Halifax, N. S.....	30.00	30.05	.....	18.4	.....	3.82	+ 0.52	nw.
Grand Manan, N. B.....	29.99	30.03	.....	16.8	.....	3.86	+ 0.45	w.
Yarmouth, N. S.....	30.05	30.07	+ .05	6.4	+ 0.4	2.38	- 0.30	w.
Saint Andrews, N. B.....	30.08	30.11	+ .09	5.7	- 0.3	2.73	+ 0.03	n.
Charlottetown, P. E. I.....	29.76	30.12	+ .06	9.6	+ 2.6	3.92	+ 0.25	w.
Chatham, N. B.....	29.90	30.13	+ .05	12.6	+ 2.6	2.81	- 0.47	sw.
Father Point, Que.....	29.54	30.09	+ .03	6.6	+ 3.1	3.40	+ 1.39	se.
Quebec, Que.....	29.77	30.11	+ .03	21.0	+ 6.0	3.91	+ 0.65	w.
Montreal, Que.....	29.70	30.10	+ .01	27.5	+ 8.5	1.67	- 0.84	sw.
Rockliffe, Ont.....	28.64	30.12	.....	- 1.1	+ 0.1	1.42	+ 0.38	w.
Toronto, Ont.....	29.44	30.11	+ .01	27.4	.....	1.60	- 1.08	w.
White River, Ont.....	29.32	30.07	+ .01	25.7	+ 7.2	2.79	- 0.67	n.
Port Stanley, Ont.....	29.33	30.07	- .01	18.2	+ 6.7	4.24	+ 1.09	e.
Saugeen, Ont.....	29.30	30.06	- .04	4.0	+ 3.5	0.93	+ 0.12	nw.
Parry Sound, Ont.....	29.19	30.12	- .06	- 8.8	+ 2.2	1.16	+ 0.50	nw.
Port Arthur, Ont.....	28.08	30.09	- .07	- 9.3	+ 2.2	1.83	+ 1.20	w.
Winnipeg, Man.....	27.60	30.09	- .07	- 5.8	+ 2.2	0.34	- 0.04	nw.
Minneapolis, Minn.....	27.57	30.05	- .13	7.8	+ 6.3	0.58	+ 0.25	nw.
Qu'Appelle, Assiniboia.....	27.30	30.10	- .08	2.8	+ 4.8	0.40	- 0.21	sw.
Medicine Hat, Assiniboia.....	26.22	30.00	- .18	8.6	+ 5.1	0.41	- 0.16	nw.
Swift Current, Assiniboia.....	28.39	30.09	.....	- 13.1	.....	0.81	.....	e.
Calgary, Alberta.....	27.50	30.07	- .05	- 3.8	+ 5.0	0.60	- 0.13	nw.
Prince Albert, Sask.....	28.14	30.07	.....	- 10.6	.....	1.37	.....	se.
Edmonton, Alberta.....	29.12	29.99	.....	24.4	.....	2.28	.....	e.
Battleford, Saskatchewan.....	29.96	30.12	- .01	63.2	5.81	n.
Spences Bridge, B. C.....								
Sable Island.....								
Hamilton, Bermuda.....								

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Saint Johns, N. F.....	29.72	29.87	+ .03	28.1	- 2.3	6.37	n.
Montreal, Que.....	29.84	30.07	+ .04	12.0	- 7.5	4.60	+ 1.04	w.

TABLE IV.—Hourly sunshine as deduced from sunshine recorders, January, 1894.

Stations.	Instrument.	Percentage recorded during the hour of local mean time ending with the respective hour.																Monthly summary.			
		A. M.								P. M.								Instrumental record.			
		5	6	7	8	9	10	11	Noon.	1	2	3	4	5	6	7	8	Actual.	Possible.	Per cent of possible.	Personal estimate.
Baltimore, Md.	T.				13	36	61	70	73	68	65	67	64	59	35			Hours.	Hours.	Hours.	
Boston, Mass.	T.				31	38	48	50	55	61	52	47	36	33				178.2	302.9	59	48
Buffalo, N. Y.	T.				9	12	28	47	56	59	55	42	23	18				135.0	294.2	46	43
Chicago, Ill.	T.				40	42	50	58	65	69	70	66	56	53				105.8	294.0	36	32
Cincinnati, Ohio	T.				40	45	60	64	67	72	71	68	56	51	41			169.2	295.8	57	42
Cleveland, Ohio	P.				18	26	34	35	40	38	35	33	36	31				182.0	304.8	60	43
Colorado Springs, Colo. *	P.				47	61	86	83	84	83	92	80	63	59				98.7	297.2	33	35
Columbus, Ohio	T.				17	23	49	63	67	66	65	66	63	55	43			165.8	222.8	75	66
Denver, Colo.	P.				63	75	87	89	85	80	82	80	70	51	43			165.2	302.1	55	38
Des Moines, Iowa	T.				40	44	45	47	51	56	54	52	47	43				233.9	303.1	77	56
Detroit, Mich.	T.				31	38	37	43	46	51	49	49	50	41				142.1	296.1	48	47
Dodge City, Kans.	P.				42	59	70	75	73	74	74	76	77	64	47			129.9	294.1	44	38
Eastport, Me.	P.				42	47	49	60	56	47	49	47	45	40				210.9	309.3	68	64
Galveston, Tex. †	P.			18	24	45	53	42	42	41	40	48	44	42	27			140.0	286.7	49	39
Kansas City, Mo.	P.				48	54	64	60	60	65	65	64	47	41	36			130.2	325.9	40	40
Key West, Fla.	T.			38	47	56	63	73	82	80	75	65	59	56	39			173.2	303.1	57	48
Louisville, Ky.	T.				43	46	56	62	65	74	58	40	35	29	28			212.9	333.6	64	45
Memphis, Tenn.	P.				37	43	52	50	43	58	55	53	47	44	43			156.4	304.2	51	45
New Haven, Conn.	T.																	151.5	312.4	49	54
New Orleans, La.	T.																				45
New Orleans, N. Y. †	T.			13	18	24	29	52	65	77	70	62	56	47	32			159.5	326.0	49	48
Philadelphia, Pa.	T.				21	29	50	57	69	72	70	59	50	39				151.5	288.6	53	41
Portland, Me.	T.				36	38	44	56	58	54	53	49	14	41	30			145.1	300.9	46	38
Portland, Oreg.	P.				37	51	63	71	72	74	77	78	53	43				185.6	289.6	64	51
Rochester, N. Y.	P.				0	15	19	17	23	24	26	22	23	7				54.0	287.3	19	18
Saint Louis, Mo.	T.				13	23	30	47	46	40	43	38	30	22				100.1	293.3	34	40
Salt Lake City, Utah	T.																				68
San Diego, Cal.	P.				15	26	31	40	54	55	55	54	38	30				121.3	296.9	41	37
San Francisco, Cal.	P.				73	78	90	87	89	89	91	88	84	81	55			265.8	318.2	84	64
Santa Fe, N. Mex.	P.				21	35	50	45	48	60	65	66	64	46	43			155.2	306.4	51	44
Savannah, Ga.	P.				65	75	82	83	85	82	79	83	83	73	57			246.9	312.7	79	71
Tucson, Ariz.	P.				38	47	56	56	55	54	59	60	54	45	39			165.7	318.4	52	45
Washington, D. C.	P.				77	82	82	84	75	81	83	78	75	68	56			247.1	319.8	77	66
Wilmington, N. C.	T.				28	38	46	46	42	43	45	48	52	48	43			134.0	303.8	44	43
					17	25	42	55	57	57	58	53	42	35	29			136.5	313.4	43	45

* For 23 days.

† For 25 days.

‡ For 30 days.

TABLE V.—Mean temperature for each hour of seventy-fifth meridian time, January, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.	41.1	40.3	39.5	39.2	38.5	38.3	37.5	37.5	37.0	38.4	41.7	44.8	47.8	50.5	51.7	52.9	53.5	53.3	51.3	48.5	46.0	44.2	42.7	42.3	44.1
Albany, N. Y.	25.1	25.1	24.4	24.4	24.0	23.8	23.7	23.7	24.5	26.0	27.7	28.9	29.6	30.3	30.3	30.2	29.5	28.8	28.0	27.6	27.5	27.0	26.3	26.0	26.8
Amarillo, Tex.	31.9	31.1	30.0	29.6	28.4	28.2	27.5	27.2	26.7	28.0	32.0	36.3	40.4	43.0	44.8	45.6	47.1	46.7	43.5	40.7	37.8	35.6	34.0	32.5	35.4
Atlanta, Ga.	44.5	44.1	43.6	43.2	42.7	42.3	42.2	41.9	42.0	43.5	45.5	47.6	49.7	51.3	52.5	52.8	52.5	51.1	49.7	48.3	47.5	46.8	46.1	45.5	46.5
Augusta, Ga.	47.3	46.8	46.1	45.5	45.1	44.8	44.4	43.7	45.0	47.3	49.9	52.3	54.1	55.4	56.1	56.7	56.8	55.8	54.1	52.2	51.1	50.0	49.0	48.1	49.9
Baker City, Oreg.	24.5	24.3	24.2	23.6	23.4	23.2	22.9	23.3	23.2	23.3	24.2	25.2	26.7	27.6	29.1	29.7	29.7	29.3	28.5	27.0	26.3	25.5	25.0	24.4	25.6
Baltimore, Md.	35.1	34.8	34.3	33.9	33.8	33.4	33.1	33.8	34.8	36.3	37.7	39.3	40.3	41.1	41.5	41.5	40.9	40.0	39.4	38.8	37.8	37.0	36.3	35.8	37.1
Boston, Mass.	28.9	28.1	27.8	27.4	27.1	26.9	26.7	27.1	27.9	29.7	31.5	33.0	33.6	34.1	34.0	33.7	33.1	32.5	31.6	31.0	30.6	30.2	29.6	29.7	30.2
Buffalo, N. Y.	30.0	29.9	29.9	29.8	29.8	29.7	29.7	30.1	30.2	30.7	31.6	32.6	32.9	32.8	32.6	32.5	32.2	31.9	31.3	31.1	30.8	30.5	30.0	29.8	30.2
Charleston, S. C.	49.9	49.5	49.0	48.6	48.4	48.0	47.9	48.1	49.5	51.7	54.0	56.0	57.1	58.0	58.2	57.0	55.7	54.1	53.5	52.2	51.8	51.5	51.1	50.5	52.1
Charlotte, N. C.	42.6	41.9	41.3	40.9	40.5	39.7	39.4	39.1	39.7	41.1	42.9	44.9	46.7	48.4	48.9	49.2	49.0	48.3	47.2	46.5	46.0	45.1	44.2	43.5	44.0
Cheyenne, Wyo.	32.4	32.4	32.0	32.0	32.4	32.4	32.1	31.6	32.2	33.0	34.6	36.3	37.7	38.7	39.2	39.2	38.9	38.4	37.8	37.0	36.3	35.8	35.3	34.8	35.9
Chicago, Ill.	27.4	27.1	26.6	26.3	25.7	25.3	25.1	25.2	25.3	26.0	27.1	28.6	29.6	30.2	30.9	31.1	31.2	31.1	30.6	30.3	29.8	29.1	28.5	27.9	28.2
Cincinnati, Ohio.	36.3	35.7	35.2	34.9	34.5	34.2	34.1	34.1	34.5	35.2	36.5	38.4	40.0	41.2	42.2	42.5	42.2	41.6	40.7	39.7	38.8	38.0	37.4	37.0	37.8
Cleveland, Ohio.	31.1	30.9	31.0	31.1	30.9	30.5	30.4	30.7	30.5	31.4	32.5	32.8	33.2	34.1	34.5	35.0	34.5	33.8	33.4	32.4	31.9	32.0	31.6	31.1	32.1
Colorado Sp'ngs, Colo.	24.8	23.3	22.3	22.0	22.0	21.7	20.8	21.0	20.3	21.9	27.3	32.2	35.5	37.3	38.4	39.3	39.2	38.2	35.5	32.7	29.9	28.0	26.3	26.3	28.6
Columbus, Ohio.	32.4	31.8	31.5	31.4	31.1	31.0	30.8	31.0	31.6	33.0	34.6	36.3	37.8	38.7	39.2	39.2	38.9	38.1	35.1	32.9	29.9	28.0	26.3	26.3	31.5
Denver, Iowa.	23.2	22.8	22.1	21.6	21.4	20.7	20.5	20.3	20.6	21.3	23.3	25.1	26.6	28.0	29.1	29.5	29.4	28.4	27.4	26.5	25.6	24.8	24.0	23.3	24.4
Denver, Colo.	28.4	28.4	27.6	26.8	25.8	25.7	24.9	25.3	25.1	25.2	28.7	34.6	37.6	39.5	40.7	41.7	41.9	40.7	39.1	36.4	32.4	30.8	29.3	28.3	32.1
Des Moines, Iowa.	19.5	19.0	18.2	17.9	17.5	17.0	16.6	15.9	16.0	17.2	19.4	22.1	24.2	25.7	27.3	28.1	27.7	26.8	25.4	23.6	22.3	21.4	20.5	19.4	21.2
Detroit, Mich.	29.1	28.8	28.4	28.2	27.7	27.4	27.3	27.2	27.3	28.0	29.0	30.2	31.0	31.7	32.4	32.5	32.3	31.6	31.2	31.1	30.6	30.1	29.5	29.1	29.7
Dodge City, Kans.	25.6	24.4	23.5	22.5	21.9	21.0	19.9	19.0	19.1	21.1	27.4	31.6	35.4	38.5	40.8	41.8	42.5	41.2	37.1	32.1	29.8	28.4	27.2	25.9	29.1
Duluth, Minn.	11.5	11.0	10.3	9.8	9.2	8.7	8.3	8.0	7.7	8.1	9.3	11.1	13.3	14.7	16.3	17.0	17.1	16.5	15.7	15.2	14.4	13.5	12.9	12.3	12.2
Eastport, Me.	21.2	20.9	20.7	20.4	20.0	19.4	19.1	19.0	19.6	20.6	21.7	22.7	23.5	24.4	24.5	24.5	24.1	23.7	23.2	22.7	22.3	21.7	21.2	21.0	21.8
El Paso, Tex.	40.3	38.8	37.5	36.0	35.0	34.5	33.2	32.4	31.1	32.1	36.0	40.7	44.7	48.4	50.8	52.6	54.1	54.3	53.6	50.5	48.4	46.5	44.4	42.5	42.4
Fort Smith, Ark.	39.3	38.2	37.8	37.1	35.9	35.6	35.2	34.8	34.9	36.2	39.2	43.0	45.8	48.1	49.5	50.4	50.7	49.5	47.6	45.6	43.7	42.2	40.6	40.0	41.7
Galveston, Tex.	57.9	57.6	57.1	56.8	56.7	56.6	56.3	55.9	57.0	58.1	58.8	59.6	60.1	60.6	60.7	60.7	60.2	59.6	59.3	59.2	58.9	58.8	58.7	58.6	58.4
Grand Haven, Mich.	28.8	28.3	27.8	27.6	27.2	27.1	26.7	26.4	26.4	27.5	28.2	28.9	29.7	30.4	30.9	31.1	31.1	30.9	30.5	29.8	29.7	29.9	29.7	29.2	28.9
Haute, Mont.	10.3	10.9	10.8	10.3	11.5	11.2	9.8	9.0	8.7	8.8	10.2	11.7	13.1	15.2	16.6	17.0	17.8	17.0	14.5	13.3	12.2	11.4	10.8	10.8	12.2
Helena, Mont.	18.8	19.1	18.9	18.6	18.6	18.4	18.2	18.2	17.8	17.3	18.1	18.9	20.8	21.0	21.6	22.4	22.1	21.9	20.9	20.0	19.0	18.7	18.1	18.0	19.4
Huron, S. Dak.	3.2	3.1	2.5	2.0	1.1	0.4	-0.3	-0.2	-0.8	-0.5	0.9	3.2	5.5	7.9	8.8	9.9	9.8	8.8	7.3	6.5	5.5	4.6	3.7	3.1	4.0
Indianapolis, Ind.	33.8	33.3	33.0	32.6	32.1	31.3	31.0	30.8	31.0	32.5	34.8	36.0	37.6	38.7	39.5	39.7	39.3	38.4	37.4	36.2	35.6	34.9	34.1	33.9	34.9
Jacksonville, Fla.	54.7	54.5	53.8	53.3	53.1	52.8	52.4	52.6	53.9	56.4	58.9	61.5	62.9	64.3	65.0	64.5	63.4	61.3	59.7	58.3	57.5	56.7	56.2	55.5	57.0
Kansas City, Mo.	28.1	27.2	26.6	26.2	25.4	24.9	24.5	24.3	24.2	25.0	26.8	29.0	31.4	33.3	34.6	35.2	34.5	33.2	32.1	31.3	30.3	29.2	28.5	27.6	29.2
Key West, Fla.	69.5	69.5	69.6	69.3	69.2	69.2	69.0	69.4	70.8	72.2	73.3	73.6	74.1	73.9	73.5	73.2	72.4	71.1	70.4	70.3	69.9	69.9	69.7	69.6	70.9
Knoxville, Tenn.	41.0	40.0	39.5	39.1	38.9	37.9	37.5	37.4	38.0	40.2	42.5	44.9	46.7	47.8	48.9	49.3	49.0	48.2	47.2	46.3	44.9	43.8	42.9	42.4	43.1
Lander, Wyo.	14.0	13.2	12.3	11.7	11.1	10.5	10.1	9.7	8.1	9.9	13.7	18.5	22.9	26.2	28.4	29.6	29.5	28.5	27.6	26.8	25.8	24.9	24.3	23.6	24.4
Little Rock, Ark.	42.9	41.9	41.2	40.5	39.6	38.9	38.5	37.8	37.9	39.3	41.6	44.3	46.5	48.6	49.8	51.0	51.5	51.2	49.8	48.7	47.5	46.0	45.4	44.3	44.4
Louisville, Ky.	38.0	37.6	36.8	36.3	35.7	35.1	34.8	34.5	35.2	37.2	39.2	41.9	44.0	45.2	46.2	46.1	45.5	44.4	43.1	42.1	41.0	40.3	39.7	39.0	40.0
Lynchburg, Va.	37.5	37.0	36.5	36.1	35.6	35.4	35.0	35.1	36.5	38.6	41.5	43.3	45.2	46.5	47.7	47.8	47.1	45.7	44.2	42.6	41.6	40.2	38.9	38.1	40.6
Marquette, Mich.	18.0	18.0	17.9	17.7	17.6	17.4	17.2	16.9	16.7	17.3	18.4	19.5	20.5	20.8	21.7	21.8	21.7	20.7	19.6	19.2	18.5	18.2	18.4	18.2	18.8
Memphis, Tenn.	43.8	42.9	42.0	41.4	40.9	40.3	39.7	39.3	39.5	41.3	44.0	46.8	48.7	49.8	50.8	51.4	51.2	50.2	49.2	48.1	47.1	46.4	45.7	45.0	45.2
Milwaukee, Wis.	23.5	23.2	22.7	22.3	22.1	21.8	21.5	21.6	22.8	24.2	26.3	27.5	28.2	28.9	29.1	28.5	27.5	26.9	26.2	25.7	25.2	24.4	23.9	24.8	24.8
Montgomery, Ala.	48.1	47.5	46.8	46.6	45.8	45.6	45.0	44.5	47.2	49.4	52.5	54.7	56.9	58.8	58.8	58.5	57.4	55.5	54.6	52.9	51.9	51.2	50.9	51.6	51.6
Moorhead, Minn.	-0.2	-0.6	-1.1	-1.6	-1.9	-2.2	-2.4	-2.9	-3.5	-3.2	-2.1	-0.4	1.2	2.8	4.2	5.1	5.5	4.8	3.8	2.8	2.2	1.5	0.6	-0.3	0.5
Nantucket, Mass.	33.5	33.5	33.4	33.0	32.6	32.6	32.9	33.4	33.9	34.2	34.8	35.0	35.1	35.2	34.9	34.5	34.0	33.9	33.7	33.9	33.9	33.7	33.7	33.6	33.9
Nashville, Tenn.	41.4	40.6	40.2	39.7	39.0	38.4	38.0	37.9	38.1	39.5	41.8	44.3	46.3	47.9	48.6	49.2	49.3	48.3	47.0	46.0	45.0	44.4	43.7	42.8	43.2
New Haven, Conn.	28.7	28.2	27.7	27.3	26.8	26.5	26.5	27.0	28.4	30.3	31.9	33.2	34.2	34.4	35.0	35.1	34.2	33.5	32.7	32.0	31.1	30.7	30.4	29.7	30.6
New Orleans, La.	55.3	54.9	54.4	53.6	53.2	52.9	53.1	53.4	54.7	56.7	58.5	60.2	61.8	62.7	62.9	62.7	61.7	60.8	59.8	58.7	57.0	56.5	56.0	55.2	57.2
New York, N. Y.	33.5	32.9	32.6	32.0	31.7	31.5	31.5	31.9	32.4	33.3	34.2	35.1	36.2	36.9	37.8	38.0	38.2	37.3	36.5	36.1	35.9	35.2	34.7	34.2	34.6
Norfolk, Va.																									

TABLE VI.—Mean pressure for each hour of seventy-fifth meridian time, January, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.....	28.277	.274	.275	.267	.266	.262	.264	.272	.282	.293	.305	.305	.285	.260	.232	.223	.222	.224	.229	.241	.255	.265	.273	.277	.264
Albany, N. Y.....	30.065	.067	.069	.068	.067	.070	.076	.089	.101	.107	.094	.065	.046	.039	.041	.042	.046	.049	.056	.062	.066	.067	.065	.061	.066
Alpena, Mich.....	29.370	.357	.362	.357	.356	.357	.366	.375	.382	.388	.387	.376	.355	.341	.342	.347	.354	.356	.358	.359	.364	.367	.370	.365	.363
Atlanta, Ga.....	28.985	.983	.985	.986	.986	.990	.001	.014	.030	.045	.050	.034	.003	.985	.977	.975	.982	.991	.997	.002	.004	.003	.008	.016	.000
Augusta, Ga.....	30.011	.012	.011	.007	.006	.012	.020	.026	.035	.051	.050	.031	.010	.986	.975	.976	.985	.997	.997	.003	.000	.003	.019	.016	.010
Baltimore, Md.....	29.968	.970	.974	.970	.975	.984	.995	.002	.017	.020	.009	.988	.972	.946	.941	.942	.946	.955	.964	.964	.970	.972	.970	.964	.974
Bismarck, N. Dak..	27.276	.174	.170	.175	.176	.174	.176	.178	.183	.187	.189	.191	.190	.167	.154	.151	.158	.168	.175	.181	.183	.184	.187	.189	.176
Boston, Mass.....	29.980	.982	.978	.977	.978	.983	.990	.999	.006	.010	.999	.976	.961	.961	.968	.977	.984	.989	.995	.994	.992	.990	.984	.974	.984
Buffalo, N. Y.....	29.325	.227	.234	.230	.226	.230	.237	.242	.254	.259	.259	.242	.219	.211	.214	.219	.225	.230	.238	.238	.236	.236	.236	.239	.233
Chicago, Ill.....	29.155	.152	.158	.157	.154	.158	.164	.171	.180	.190	.193	.186	.160	.139	.136	.144	.148	.153	.159	.161	.160	.163	.163	.154	.161
Cincinnati, Ohio...	29.466	.465	.478	.466	.463	.467	.475	.480	.494	.504	.514	.505	.476	.457	.443	.446	.451	.453	.457	.458	.458	.464	.465	.463	.469
Cleveland, Ohio...	29.293	.294	.299	.301	.298	.300	.302	.301	.310	.319	.323	.310	.293	.276	.274	.276	.284	.294	.300	.305	.300	.292	.290	.290	.297
Colorado Sp'gs, Colo	23.900	.898	.896	.896	.900	.899	.902	.905	.909	.912	.914	.906	.876	.858	.845	.844	.850	.862	.878	.888	.895	.901	.902	.889	.889
Columbus, Ohio...	29.197	.198	.202	.199	.196	.201	.207	.213	.220	.223	.229	.216	.194	.179	.175	.178	.184	.189	.194	.197	.196	.197	.197	.194	.199
Davenport, Iowa...	29.422	.423	.431	.436	.433	.428	.430	.435	.439	.442	.444	.436	.408	.392	.384	.384	.390	.395	.403	.408	.411	.417	.423	.423	.418
Denver, Colo.....	24.657	.644	.645	.645	.645	.637	.633	.632	.633	.639	.650	.658	.656	.637	.613	.599	.598	.604	.614	.625	.637	.648	.652	.659	.636
Des Moines, Iowa...	29.153	.149	.149	.151	.147	.142	.144	.145	.143	.154	.159	.155	.139	.118	.105	.103	.108	.115	.125	.135	.135	.145	.151	.153	.139
Detroit, Mich.....	29.287	.286	.286	.283	.281	.282	.290	.299	.306	.315	.319	.309	.291	.274	.270	.273	.280	.288	.293	.294	.291	.291	.290	.287	.290
Dodge City, Kans...	27.389	.384	.379	.381	.380	.377	.377	.385	.395	.406	.421	.427	.405	.375	.351	.343	.347	.351	.360	.374	.382	.388	.391	.393	.382
Duluth, Minn.....	29.294	.297	.304	.312	.310	.312	.314	.316	.315	.314	.312	.305	.275	.250	.251	.256	.267	.275	.281	.286	.282	.286	.288	.293	.292
Eastport, Me.....	29.969	.968	.964	.960	.966	.975	.991	.005	.016	.008	.986	.967	.956	.954	.955	.957	.963	.968	.974	.980	.982	.980	.973	.967	.974
El Paso, Tex.....	26.260	.259	.258	.260	.263	.263	.264	.269	.282	.293	.303	.311	.302	.273	.241	.220	.209	.206	.206	.215	.223	.233	.239	.247	.254
Galveston, Tex....	30.119	.113	.109	.107	.104	.105	.114	.121	.133	.153	.162	.155	.128	.098	.078	.071	.072	.078	.083	.090	.101	.109	.114	.112	.110
Grand Haven, Mich.	29.346	.348	.352	.354	.353	.352	.356	.360	.367	.374	.380	.374	.357	.337	.329	.330	.336	.340	.347	.348	.344	.343	.341	.341	.350
Havre, Mont.....	27.286	.284	.277	.271	.273	.270	.264	.266	.268	.274	.284	.303	.315	.327	.337	.349	.377	.374	.379	.379	.387	.390	.394	.397	.385
Helena, Mont.....	25.677	.679	.674	.671	.678	.676	.674	.668	.665	.669	.681	.683	.684	.674	.656	.643	.644	.653	.661	.663	.669	.675	.678	.680	.670
Huron, S. Dak.....	28.647	.645	.643	.646	.643	.637	.639	.639	.640	.647	.653	.657	.647	.629	.614	.614	.621	.626	.635	.643	.646	.649	.652	.656	.640
Indianapolis, Ind...	29.275	.273	.279	.286	.283	.290	.300	.308	.315	.325	.336	.347	.356	.371	.387	.395	.401	.408	.415	.420	.427	.434	.441	.448	.435
Jacksonville, Fla...	30.146	.142	.138	.137	.135	.144	.157	.172	.184	.192	.190	.172	.140	.119	.110	.111	.116	.131	.142	.153	.157	.163	.162	.155	.149
Kansas City, Mo...	29.064	.065	.057	.057	.053	.053	.057	.059	.065	.075	.090	.090	.062	.039	.024	.019	.025	.029	.035	.049	.058	.065	.070	.075	.055
Keeler, Cal.....	26.376	.373	.367	.361	.359	.356	.354	.360	.386	.411	.424	.438	.437	.420	.390	.361	.344	.334	.327	.329	.340	.351	.358	.366	.372
Key West, Fla.....	30.145	.136	.128	.125	.125	.130	.142	.158	.177	.186	.181	.165	.141	.119	.110	.109	.114	.121	.131	.144	.151	.158	.159	.154	.142
Knoxville, Tenn...	29.125	.127	.130	.133	.134	.141	.150	.160	.165	.173	.177	.162	.135	.116	.110	.109	.115	.124	.132	.142	.152	.162	.170	.173	.135
Little Rock, Ark...	29.826	.822	.823	.825	.824	.827	.833	.843	.851	.870	.882	.875	.844	.809	.785	.774	.777	.778	.783	.791	.798	.805	.812	.817	.820
Louisville, Ky.....	29.575	.575	.575	.578	.577	.578	.586	.597	.613	.619	.624	.617	.588	.566	.558	.558	.562	.564	.564	.570	.573	.573	.570	.570	.580
Lynchburg, Va.....	29.449	.451	.454	.453	.456	.459	.470	.478	.489	.492	.483	.462	.430	.413	.406	.408	.415	.421	.432	.442	.448	.446	.445	.443	.448
Marquette, Mich...	29.188	.187	.192	.191	.190	.187	.191	.194	.193	.197	.203	.201	.182	.164	.161	.169	.170	.179	.185	.186	.188	.187	.187	.186	.186
Memphis, Tenn.....	29.804	.804	.808	.812	.810	.816	.826	.836	.846	.860	.863	.850	.824	.797	.782	.778	.777	.784	.789	.791	.797	.798	.798	.799	.810
Milwaukee, Wis....	29.308	.309	.319	.324	.329	.332	.334	.332	.337	.343	.346	.339	.318	.299	.292	.294	.298	.302	.305	.305	.302	.301	.300	.300	.329
Moorhead, Minn...	29.022	.018	.019	.022	.020	.017	.020	.021	.023	.030	.036	.042	.026	.010	.002	.005	.015	.021	.026	.030	.032	.029	.028	.026	.023
Nantucket, Mass...	30.090	.092	.097	.092	.094	.097	.102	.109	.115	.119	.116	.096	.084	.081	.086	.094	.098	.105	.112	.116	.115	.108	.104	.096	.101
Nashville, Tenn...	29.559	.561	.562	.562	.564	.566	.577	.585	.597	.605	.605	.590	.554	.539	.532	.531	.536	.535	.546	.547	.548	.555	.554	.554	.561
New Haven, Conn...	30.011	.018	.017	.010	.008	.018	.025	.036	.045	.055	.043	.021	.002	.994	.996	.997	.997	.998	.010	.020	.018	.017	.015	.007	.017
New Orleans, La...	30.107	.102	.097	.095	.094	.096	.106	.118	.132	.143	.147	.137	.113	.087	.070	.063	.067	.075	.085	.098	.102	.105	.106	.106	.102
New York, N. Y....	29.948	.949	.950	.948	.949	.952	.962	.977	.989	.995	.983	.964	.930	.928	.928	.932	.937	.943	.943	.943	.945	.945	.945	.945	.951
Norfolk, Va.....	30.118	.118	.118	.118	.118	.127	.136	.145	.162	.167	.162	.138	.108	.095	.092	.097	.103	.111	.118	.123	.125	.126	.120	.114	.123
Olympia, Wash....	29.911	.915	.918	.915	.916	.921	.918	.913	.909	.909	.919	.915	.922	.924	.914	.903	.894	.896	.905	.908	.914	.917	.921	.924	.913
Omaha, Neb.....	28.887	.883	.883	.886	.879	.879	.878	.880	.884	.892	.901	.904	.892	.870	.849	.845	.852	.860	.871	.880	.886	.888	.890	.893	.880
Philadelphia, Pa...	30.035	.040	.044	.040	.043	.048	.062	.072	.085	.092	.081	.054	.033	.024	.018	.022	.025	.031	.035	.037	.039	.040	.039	.036	.045
Pikes Peak, Colo...	17.462	.454	.443	.438	.437	.430	.423	.427	.441	.456	.473	.481	.482	.472	.461	.461	.462	.464	.468	.467	.468	.467	.465	.464	.457
Pittsburg, Pa.....	29.243	.244	.246	.248	.245	.247	.252	.255	.257	.263	.264	.249	.225	.213	.207	.214	.221	.228	.238	.243	.242	.242	.240	.236	.240
Portland, Ore.....	29.855	.861	.859	.854	.860	.863	.854	.849	.848	.851	.855	.866	.876	.877	.858	.843	.837	.840	.844	.846	.850	.857	.860	.864	.855
Rochester, N. Y....	29.545	.543	.544	.544	.543	.546	.553	.562	.573	.578	.575	.562	.534	.525	.527	.535	.544	.549	.553	.555	.554	.555	.552	.546	.550
Roseburg, Ore.....	29.531	.535	.536	.533	.529	.529	.525	.515	.513	.515	.519	.529	.539	.539	.528	.515	.504	.505	.508	.515	.520	.525	.535	.542	.524
St. Louis, Mo.....	29.495	.499	.492	.493	.495	.499	.510	.517	.523	.536	.537	.533	.504	.474	.458	.457									

TABLE VII.—Average wind movement for each hour of seventy-fifth meridian time, January, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.....	10.1	9.3	9.0	8.8	8.4	9.3	8.8	8.5	8.4	9.2	10.9	11.5	11.7	11.7	12.3	12.4	12.3	11.6	10.4	8.5	8.0	8.1	8.2	8.7	9.8
Albany, N. Y.....	7.3	7.3	7.1	6.7	6.8	7.0	7.1	6.9	7.5	8.7	10.0	10.4	10.8	10.4	10.6	10.1	9.2	8.9	8.1	7.4	7.9	7.3	7.6	7.6	8.3
Alpena, Mich.....	10.1	9.9	9.5	9.3	9.6	9.6	9.7	9.3	9.5	10.6	11.4	11.7	12.0	12.0	11.8	11.7	11.1	11.1	10.2	10.1	10.5	10.5	9.9	9.5	10.4
Amarillo, Tex.....	17.3	16.2	17.2	16.8	17.3	17.6	17.8	17.6	17.4	15.9	16.9	18.5	19.7	21.5	21.6	20.9	20.9	18.6	14.8	13.4	14.1	15.4	16.5	16.8	17.5
Atlanta, Ga.....	11.2	10.9	10.6	10.7	10.4	10.5	10.4	10.5	9.5	9.9	10.3	9.7	9.9	10.3	10.1	9.8	10.0	9.9	9.8	9.6	9.4	10.5	11.1	11.1	10.2
Atlantic City, N. J....	10.5	11.2	11.3	11.5	11.2	10.8	10.8	10.6	11.4	13.6	14.3	13.8	14.2	13.6	13.0	13.1	12.3	10.9	10.4	11.2	10.4	10.6	10.5	10.8	11.7
Augusta, Ga.....	5.3	5.2	4.7	4.5	4.9	5.0	5.3	5.1	5.5	6.1	7.0	7.3	8.2	8.0	8.1	8.2	7.9	6.5	6.1	5.5	5.6	5.4	5.4	5.6	6.1
Baker City, Oreg.....	6.4	5.8	6.1	6.1	6.1	5.9	5.5	5.2	5.7	5.6	5.7	5.6	6.1	6.5	6.2	6.3	6.0	5.8	5.4	5.4	6.4	6.1	5.5	5.3	5.9
Baltimore, Md.....	7.0	6.5	6.0	6.0	5.9	5.8	5.7	6.3	7.2	8.3	9.3	9.5	9.8	9.6	9.2	8.7	7.6	6.7	6.5	6.2	6.5	6.7	6.8	6.8	7.3
Bismarck, N. Dak.....	7.9	8.4	8.7	8.9	8.0	7.8	7.9	7.5	7.7	7.6	7.7	8.6	9.5	10.3	10.4	10.2	9.4	8.1	7.6	7.2	7.2	7.3	7.9	7.1	8.4
Block Island, R. I....	18.8	18.1	18.4	17.9	18.7	17.8	17.1	17.2	18.0	18.5	18.4	17.3	17.6	18.3	17.8	17.9	17.2	18.1	19.0	19.1	18.7	19.6	19.0	18.6	18.2
Boston, Mass.....	11.9	11.9	11.5	11.4	11.3	10.8	11.0	11.2	12.1	12.4	12.7	13.6	13.8	13.3	13.5	13.1	13.1	12.6	12.5	12.5	11.8	11.7	12.1	12.3	12.3
Buffalo, N. Y.....	15.0	13.7	14.3	14.3	13.5	12.9	13.0	13.2	13.2	13.5	13.8	13.9	13.8	13.7	14.3	14.0	14.2	14.0	13.0	12.1	13.1	13.4	12.9	13.6	13.6
Cairo, Ill.....	8.8	8.9	8.4	8.8	8.5	8.2	8.4	8.4	8.2	8.9	9.6	10.2	10.9	10.6	10.6	9.7	9.5	9.1	9.4	10.1	10.8	10.6	10.0	9.0	9.4
Cape Henry, Va.....	12.9	13.6	14.2	14.6	14.7	15.2	15.5	15.3	15.5	16.3	17.1	16.1	14.4	13.4	13.5	13.1	11.4	10.7	10.5	11.0	11.5	12.7	12.7	12.5	13.7
Charleston, S. C.....	8.0	8.1	7.8	7.5	7.5	7.0	7.6	7.2	7.1	7.9	9.2	9.7	10.0	10.0	10.4	10.6	9.7	8.7	7.8	8.3	7.8	7.6	7.5	7.4	8.4
Charlotte, N. C.....	6.9	6.6	6.7	6.4	6.5	6.5	6.5	6.3	6.6	6.9	7.6	7.8	8.6	8.8	8.7	8.1	7.6	6.5	6.1	6.3	6.3	7.2	7.2	6.8	7.1
Chattanooga, Tenn....	5.8	6.2	6.2	5.8	6.0	5.2	4.5	4.9	5.5	6.0	6.5	6.8	7.8	7.8	9.5	9.5	8.5	7.3	7.2	6.8	6.6	7.0	6.3	6.7	6.7
Cheyenne, Wyo.....	11.3	11.0	12.4	11.5	12.2	12.7	14.0	14.0	14.5	14.8	15.8	17.3	18.3	20.0	20.1	19.6	18.8	16.7	13.3	11.7	11.7	12.2	12.1	11.3	14.5
Chicago, Ill.....	20.0	19.2	18.5	18.4	18.4	17.9	18.0	16.9	17.6	18.1	18.6	19.2	20.2	19.5	20.5	20.7	19.9	18.7	18.3	18.4	18.3	19.7	20.4	20.3	19.0
Cincinnati, Ohio.....	7.3	7.2	6.6	6.6	6.1	6.4	6.2	6.4	6.8	7.7	8.5	8.2	9.4	9.6	9.6	9.7	9.2	8.4	7.8	7.2	7.5	7.1	7.1	7.3	7.7
Cleveland, Ohio.....	15.5	14.4	14.9	14.7	15.3	15.6	14.8	14.3	14.8	14.5	14.8	15.6	15.1	14.2	14.6	14.8	13.5	12.6	12.9	13.6	14.3	15.1	15.0	15.5	14.6
Colorado Springs, Colo.	9.5	9.6	10.1	10.1	9.3	8.9	10.3	10.3	10.3	10.3	10.3	10.8	13.0	14.0	14.7	14.7	14.4	13.6	11.4	11.5	10.4	9.5	8.4	11.2	11.2
Columbia, Mo.....	6.7	6.4	6.4	6.0	5.9	6.0	6.7	6.3	6.6	7.3	8.4	9.2	9.3	9.7	9.4	9.5	8.8	7.7	6.5	6.3	6.6	7.1	7.3	7.0	7.4
Columbus, Ohio.....	10.2	9.8	9.5	9.5	9.2	9.4	9.0	8.5	9.0	9.2	10.0	11.1	11.7	11.7	12.2	12.0	11.4	10.6	10.8	11.3	11.1	10.7	10.4	10.3	10.4
Concordia, Kans.....	6.5	7.0	6.7	6.4	6.1	5.8	5.4	6.3	6.0	6.1	6.7	7.7	8.2	9.5	10.3	10.3	9.8	8.2	6.5	5.7	6.0	6.4	6.8	7.5	7.2
Corpus Christi, Tex....	9.9	9.3	9.6	10.3	9.8	9.3	9.1	9.3	9.4	8.8	9.7	10.4	12.3	12.3	12.9	12.9	13.5	13.0	11.9	10.9	10.3	10.2	9.9	9.6	10.6
Davenport, Iowa.....	9.0	9.4	9.1	8.2	8.6	8.5	8.6	8.2	8.9	9.4	10.2	10.8	11.1	11.4	11.8	11.3	10.6	9.8	8.8	8.3	8.8	9.0	9.3	9.6	9.5
Denver, Colo.....	7.1	6.9	7.8	8.8	8.2	7.2	7.3	7.7	8.1	7.7	7.6	7.5	9.5	11.0	11.1	12.2	12.9	12.6	11.3	9.6	9.0	8.3	7.4	7.2	8.9
Des Moines, Iowa.....	7.6	7.6	7.6	7.1	6.9	6.7	6.9	6.5	6.8	7.8	8.4	8.8	9.4	9.9	9.8	10.2	10.2	9.3	7.8	7.5	8.0	7.8	7.1	7.5	8.0
Detroit, Mich.....	12.4	11.8	12.0	11.8	11.5	10.7	11.2	11.4	11.9	12.3	12.4	12.4	12.4	13.0	12.4	12.3	12.0	11.1	11.5	11.6	12.0	11.9	12.5	12.0	11.9
Dodge City, Kans.....	8.2	8.5	9.3	9.2	8.8	8.8	8.9	8.3	7.6	8.2	9.5	11.1	11.8	12.7	13.0	12.3	11.6	11.6	9.2	7.5	7.0	7.8	8.5	8.3	9.5
Dubuque, Iowa.....	5.5	5.2	5.3	5.3	4.9	5.0	5.0	4.5	4.8	5.2	5.5	6.3	6.6	7.1	6.8	6.5	6.6	5.8	4.9	4.9	5.0	5.3	5.4	5.8	5.5
Duluth, Minn.....	6.2	6.0	6.4	6.5	6.4	6.7	6.8	6.4	6.1	5.8	6.0	5.8	5.5	5.6	5.5	5.7	5.6	5.5	6.3	6.4	6.9	6.5	7.4	7.1	6.2
Eastport, Me.....	14.5	14.6	14.9	14.6	14.1	14.7	14.3	13.7	13.9	14.2	14.9	15.0	14.9	14.5	14.4	13.5	13.2	14.4	15.1	15.8	14.9	15.0	14.4	15.3	14.6
El Paso, Tex.....	8.6	7.9	8.2	7.6	7.5	7.6	8.0	7.6	7.8	9.1	9.2	9.8	10.8	12.0	12.9	13.6	13.1	12.0	11.1	9.7	9.3	9.5	9.1	8.9	9.6
Erie, Pa.....	13.8	13.3	13.2	13.3	12.9	13.9	14.1	13.7	14.8	13.6	14.0	13.5	13.5	13.2	11.9	11.7	11.2	11.1	12.0	13.4	13.7	13.3	13.3	13.2	13.2
Eureka, Cal.....	6.6	6.8	6.5	6.4	6.3	5.5	5.5	5.9	6.1	6.0	6.6	5.8	6.1	7.0	8.0	9.1	8.6	8.3	8.8	8.6	8.3	8.1	7.3	6.8	7.0
Fort Canby, Wash.....	19.0	18.6	17.6	18.0	16.7	17.3	17.1	16.4	17.4	16.6	17.8	18.3	19.1	19.8	20.3	19.6	19.1	18.6	17.7	17.8	18.6	18.6	19.3	19.2	18.3
Fort Smith, Ark.....	6.6	7.2	6.8	7.3	7.6	6.6	6.6	7.4	7.1	7.3	7.8	7.5	8.0	8.7	8.5	8.4	8.2	8.1	7.2	7.6	7.0	6.9	6.7	6.6	7.4
Fresno, Cal.....	3.9	4.5	4.1	4.0	3.7	3.8	3.9	3.4	3.6	3.3	3.5	3.6	4.3	4.7	5.3	5.3	5.5	5.5	5.4	5.1	4.3	4.1	4.5	4.7	4.3
Galveston, Tex.....	9.7	10.6	10.8	11.1	11.2	10.7	10.5	10.4	10.9	11.8	11.7	11.8	11.5	11.6	11.7	11.5	11.3	10.3	9.8	9.6	9.9	10.2	10.0	10.8	10.8
Grand Haven, Mich....	13.3	12.8	12.5	12.1	12.4	12.7	11.9	11.7	11.9	12.1	12.4	12.3	12.9	12.7	12.8	12.8	13.1	11.9	11.6	12.0	12.4	12.7	13.2	12.4	12.4
Green Bay, Wis.....	7.1	7.8	8.2	8.3	8.5	8.3	8.5	8.5	7.9	8.2	8.8	9.3	9.0	9.1	9.4	9.1	8.5	7.9	8.0	7.6	8.2	8.4	8.7	8.4	8.4
Hannibal, Mo.....	8.7	8.8	7.7	7.4	7.3	7.4	7.5	8.1	8.1	8.9	9.7	11.4	11.5	11.3	11.1	10.3	9.5	8.4	9.0	9.3	9.5	9.5	8.7	8.7	9.2
Harrisburg, Pa.....	6.4	6.4	6.9	6.8	6.4	6.2	6.9	6.8	7.4	7.6	7.5	7.6	8.3	8.6	8.9	8.7	8.1	7.7	7.1	6.6	7.0	6.7	6.8	6.4	7.2
Hatteras, N. C.....	14.2	14.5	14.5	15.7	15.9	16.0	16.6	16.6	16.1	16.0	16.4	16.4	16.6	17.2	16.6	16.1	15.5	15.1	14.9	15.2	15.0	14.7	14.2	14.0	15.6
Havre, Mont.....	9.6	9.2	9.8	10.2	9.6	10.4	10.3	9.9	9.4	10.4	11.8	12.4	13.2	12.5	13.5	13.2	13.2	11.9	10.5	9.3	9.4	9.8	9.6	10.2	10.8
Helena, Mont.....	6.6	6.1	6.3	6.0	6.0	6.5	5.6	6.2	6.6	7.1	6.2	6.9	7.1	7.3	8.3	7.3	6.8	6.0	6.0	6.1	6.5	6.0	6.9	5.8	6.5
Huron, S. Dak.....	11.3	10.8	10.5	10.3	10.2	10.4	10.4	9.8	9.9	9.7	10.5	11.4	12.7	12.6	12.2	12.8	12.8	12.3	12.4	11.5	11.2	11.0	10.9	10.7	11.5
Idaho Falls, Idaho....	9.2	9.0	9.0	9.4	9.6	9.5	9.6	9.3	8.9	8.8	8.5	8.6	9.4	9.7	10.0	10.2	10.7	10.6	10.3	9.3	8.9	9.1	10.5	10.1	9.5
Indianapolis, Ind.....	6.8	7.3	6.7	6.2	6.1	6.7	6.7	6.4	6.8	7.5	7.6	8.5	8.8	9.1	9.1	8.5	8.0	7.9	8.0	7.5	7.2	7.2	7.2	7.4	7.4
Jacksonville, Fla.....	5.1	5.3	4.8	4.8	4.9	5.5	5.4	5.7	5.9	7.2	7.3	7.6	8.1	7.9	8.4	8.7	8.1	7.0	6.3	5.7					

TABLE VII.—Average wind movement, etc.—Continued.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Oklahoma, Okla.....	8.5	8.1	8.0	7.9	8.2	8.9	9.1	9.6	9.4	9.7	11.3	11.5	11.6	11.4	11.7	11.7	11.5	10.4	8.0	7.6	7.8	8.5	8.7	9.0	9.5
Olympia, Wash.....	6.3	5.8	5.7	5.9	5.8	5.6	5.4	4.4	4.9	4.2	5.5	4.6	5.8	6.2	6.5	6.8	6.7	6.6	6.7	5.9	4.9	5.0	5.5	5.8	5.7
Omaha, Nebr.....	7.0	6.6	6.4	6.4	6.5	6.8	6.9	6.8	6.9	7.4	8.4	8.5	8.0	8.5	8.8	8.7	8.9	8.3	7.7	7.6	7.3	7.4	7.2	7.4	7.5
Oswego, N. Y.....	13.3	13.9	13.9	14.5	14.5	14.5	13.9	15.1	16.1	16.5	16.5	15.8	15.4	15.1	14.6	14.5	14.5	14.0	13.7	14.7	14.6	14.4	13.8	13.2	14.6
Palestine, Tex.....	6.2	6.2	5.8	5.9	5.3	5.4	5.6	5.5	5.5	6.1	6.7	7.4	8.2	8.0	8.5	8.4	7.7	6.9	5.6	5.0	5.3	5.6	6.0	5.8	6.4
Parkersburg, W. Va..	6.8	6.1	5.7	5.5	5.6	5.8	5.0	5.0	5.6	5.8	6.0	6.6	7.4	8.1	8.2	7.1	6.9	5.8	5.5	5.4	5.9	5.8	6.3	7.0	6.2
Pensacola, Fla.....	9.2	9.3	9.6	9.5	9.0	8.8	8.5	8.9	8.9	9.5	10.3	10.3	10.1	10.7	10.2	9.7	9.2	8.5	7.6	8.2	8.3	8.2	8.3	8.4	9.1
Philadelphia, Pa.....	9.9	10.2	9.9	9.3	9.2	9.4	9.5	9.6	9.9	10.6	11.1	11.1	11.6	11.9	11.6	11.5	10.9	11.2	10.9	10.5	9.3	9.1	9.3	9.3	10.3
Pierre, S. Dak.....	5.8	5.9	5.9	6.5	7.2	7.2	6.1	6.7	7.1	6.6	6.5	7.0	7.7	7.8	8.1	8.2	8.1	8.4	8.4	7.4	6.3	6.0	6.0	5.8	6.9
Pikes Peak, Colo.....	33.4	35.0	35.9	36.4	33.6	33.4	34.8	33.4	32.8	32.3	30.5	28.7	29.2	29.0	29.4	29.3	28.9	32.3	33.0	34.1	35.6	34.6	34.0	32.8	32.6
Pittsburg, Pa.....	6.3	6.4	6.2	6.4	6.7	6.5	7.1	7.2	7.8	7.8	8.4	8.8	9.0	8.9	9.1	8.9	7.7	6.8	6.5	7.3	6.9	6.9	6.8	6.4	7.4
Port Angeles, Wash..	5.5	5.3	4.6	5.8	5.2	5.3	4.6	5.3	5.1	5.3	4.5	4.9	5.6	5.1	4.8	5.6	4.9	5.4	4.5	4.4	4.5	5.1	4.7	5.3	5.1
Port Huron, Mich....	11.6	11.6	11.2	11.8	11.8	11.6	11.5	11.6	11.5	12.5	13.4	13.6	13.7	13.5	13.9	13.0	12.3	11.5	11.2	11.5	11.5	11.8	11.5	11.7	12.1
Portland, Me.....	7.5	7.5	7.1	6.9	7.0	6.9	6.7	7.6	8.0	8.2	8.8	8.7	9.4	9.1	9.6	8.5	8.0	8.0	8.1	7.5	7.7	7.6	7.4	7.8	7.9
Portland, Oreg.....	9.8	9.9	10.2	9.6	9.6	9.6	10.9	10.8	11.2	10.8	10.3	10.7	10.6	11.2	12.3	13.8	13.3	11.8	11.6	11.2	10.1	10.3	10.2	11.0	10.9
Pueblo, Colo.....	7.7	8.2	6.6	7.1	7.4	7.0	6.8	7.3	7.4	6.7	7.2	8.9	12.0	12.5	12.4	12.6	12.4	12.0	12.4	10.3	9.2	9.0	8.2	8.6	9.2
Raleigh, N. C.....	6.0	5.8	5.7	5.7	5.5	5.9	6.0	5.3	6.1	6.5	7.3	8.2	9.2	8.3	8.1	8.3	7.1	6.3	5.4	5.6	5.3	5.2	5.5	5.9	6.4
Rapid City, S. Dak...	6.5	7.6	7.7	7.8	7.8	8.8	7.9	8.0	8.6	8.5	8.4	8.4	8.1	8.7	9.2	9.2	9.4	8.5	6.5	6.0	5.7	5.9	6.3	6.4	7.7
Red Bluff, Cal.....	6.6	7.0	6.3	5.8	5.8	6.1	6.2	6.5	6.2	6.0	6.3	6.4	6.7	7.4	7.5	8.5	8.7	8.8	9.0	8.4	6.8	6.7	6.6	6.9	7.0
Rocheater, N. Y.....	8.9	9.0	8.9	9.0	8.7	8.5	9.5	9.2	9.5	10.2	10.5	10.7	11.7	11.0	10.8	10.1	9.0	8.5	9.0	9.0	8.9	8.9	8.8	8.6	9.5
Roseburg, Oreg.....	3.4	2.8	3.1	3.2	2.7	3.4	3.7	3.9	3.5	3.7	3.7	3.5	2.9	3.4	4.3	4.6	4.5	5.3	4.6	3.8	3.1	3.1	2.9	3.1	3.6
Sacramento, Cal.....	6.8	6.4	6.3	6.3	6.5	5.9	5.5	6.3	6.4	6.2	6.3	6.7	7.5	8.0	8.9	8.7	8.5	7.8	7.9	6.9	6.5	6.9	6.7	6.2	6.9
St. Louis, Mo.....	11.3	11.3	10.8	10.3	10.4	10.9	11.1	10.4	10.7	11.3	11.7	12.3	12.7	13.3	13.5	13.2	13.7	12.5	12.4	11.9	11.9	12.0	11.9	12.1	11.8
St. Paul, Minn.....	8.3	7.1	6.6	6.3	6.5	6.3	7.4	6.5	6.1	6.2	6.7	7.1	7.4	7.0	7.3	7.5	7.3	7.3	6.8	6.7	5.9	6.6	7.2	8.2	6.9
St. Vincent, Minn....	8.6	8.4	8.2	8.5	8.6	8.9	9.3	9.0	9.4	9.4	9.0	9.4	10.2	10.8	11.4	11.7	11.1	10.1	9.6	9.2	9.0	9.0	8.8	8.8	9.4
Salt Lake City, Utah.	4.8	4.9	4.5	4.6	5.1	4.6	4.8	4.7	5.2	5.4	5.7	6.3	6.7	6.8	6.9	7.1	7.1	7.0	6.0	5.1	5.1	4.9	4.8	5.3	5.6
San Antonio, Tex.....	6.8	6.1	5.7	5.5	5.3	5.8	5.2	5.1	5.3	5.0	5.3	6.8	8.0	7.9	8.0	7.8	7.7	7.9	7.3	6.5	6.3	7.1	7.0	6.8	6.5
San Diego, Cal.....	3.8	4.2	3.8	4.1	4.1	4.1	3.8	3.7	3.8	4.0	3.7	3.3	3.9	5.2	6.9	7.8	8.8	9.1	8.1	6.9	4.7	4.0	4.5	4.4	5.0
Sandusky, Ohio.....	9.0	8.5	8.6	9.2	9.2	7.5	8.6	8.0	7.8	8.7	9.1	8.5	8.9	8.9	8.9	8.8	8.5	7.9	8.1	8.6	8.9	9.2	9.0	8.5	8.6
San Francisco, Cal....	6.6	7.1	7.0	6.4	6.9	7.0	6.7	6.9	7.0	6.8	7.4	7.3	7.8	8.5	9.2	9.9	10.4	10.8	10.3	9.4	8.6	8.4	7.7	7.7	8.0
Santa Fe, N. Mex.....	5.5	5.7	6.2	5.7	5.6	5.3	4.8	5.1	6.3	6.8	7.0	8.6	8.9	10.3	10.5	10.2	10.3	9.9	8.5	6.2	5.7	5.0	5.3	4.8	7.0
Sault Ste. Marie, Mich	9.0	8.3	8.8	8.9	8.1	7.7	7.5	7.1	7.7	8.4	8.6	8.8	10.3	10.4	10.8	10.9	10.3	10.8	10.3	10.3	9.8	9.6	9.2	9.4	9.2
Savannah, Ga.....	7.9	7.6	8.0	7.5	7.1	7.4	8.0	7.4	7.6	8.7	9.1	9.6	10.0	10.0	9.8	9.5	9.0	8.3	7.9	7.7	7.6	7.5	7.8	8.1	8.3
Seattle, Wash.....	8.4	7.9	7.7	8.4	8.3	8.2	7.8	7.5	7.4	7.3	7.6	7.2	7.8	7.7	8.9	9.5	9.5	9.0	8.9	8.5	7.7	7.7	7.8	8.3	8.1
Shreveport, La.....	7.5	7.7	7.2	6.7	6.9	6.8	6.8	6.9	6.9	7.5	7.1	6.9	6.5	7.3	7.6	8.3	8.1	7.7	6.9	6.5	6.7	7.1	7.5	7.5	7.2
Sioux City, Iowa.....	9.4	9.4	9.5	9.6	8.8	8.7	8.6	9.2	9.6	10.1	10.5	11.1	10.5	10.7	11.3	12.0	11.2	10.6	10.0	10.3	10.1	10.0	10.1	9.7	10.0
Southport, N. C.....	8.7	9.1	9.1	9.1	9.2	8.7	8.5	9.4	9.7	11.4	12.9	12.6	12.4	11.7	12.2	11.4	11.1	9.8	9.2	9.4	9.2	9.4	9.3	9.3	10.1
Spokane, Wash.....	6.3	6.0	6.0	5.4	5.4	5.5	6.3	5.8	5.1	5.2	5.3	5.3	5.8	5.5	5.9	6.7	7.1	6.3	5.8	5.5	5.8	5.8	6.2	5.5	5.8
Springfield, Ill.....	9.5	9.1	8.7	8.5	8.6	8.6	9.5	9.3	8.6	9.5	10.4	10.7	10.9	12.0	11.6	11.3	11.0	9.9	9.6	9.4	9.8	10.4	9.7	9.6	9.8
Springfield, Mo.....	9.5	9.7	9.2	8.6	8.5	8.5	8.8	9.1	9.3	10.0	11.0	10.6	10.9	11.1	10.9	11.4	10.8	9.8	9.1	9.4	9.5	9.7	10.0	10.3	9.8
Tampa, Fla.....	4.7	5.0	5.1	4.7	4.7	5.1	4.8	4.5	4.8	5.2	6.0	6.4	7.5	7.3	7.2	7.3	6.9	6.2	4.6	4.4	4.1	3.9	4.0	4.0	5.3
Tatoosh Island, Wash	18.0	17.5	17.3	16.8	17.8	17.2	16.9	18.7	18.9	18.2	19.5	20.2	20.2	21.5	20.3	20.2	19.5	18.7	17.1	16.5	16.4	17.5	18.1	18.3	18.4
Titusville, Fla.....	8.1	8.2	9.1	8.7	8.3	7.9	8.9	7.7	7.5	8.8	10.3	11.2	12.8	12.9	13.9	14.3	14.1	12.5	12.0	11.1	10.7	9.4	8.6	7.9	10.2
Toledo, Ohio.....	10.3	10.0	9.6	9.3	9.7	9.5	9.3	9.3	9.5	9.7	10.7	10.6	11.3	11.6	11.6	12.0	11.7	10.6	9.8	10.5	10.1	11.5	11.7	11.3	10.5
Tucson, Ariz.....	7.1	6.0	5.8	5.1	5.5	5.3	5.8	4.9	5.7	5.8	4.6	6.6	6.5	6.8	8.1	9.4	9.4	9.4	8.9	8.7	8.3	7.7	7.0	5.9	6.7
Valentine, Nebr.....	7.3	6.8	6.8	7.7	7.5	8.5	8.3	8.6	8.4	8.6	8.3	9.0	10.5	10.6	11.6	12.5	11.5	10.7	8.9	7.5	6.7	7.8	6.9	7.1	8.7
Vicksburg, Miss.....	7.8	7.7	7.1	6.5	7.0	7.4	7.7	7.4	8.1	8.3	8.1	7.7	8.2	7.6	7.4	7.6	7.1	6.7	6.6	6.3	6.7	7.4	7.6	7.6	7.4
Vineyard Haven, Mass	10.2	9.5	9.4	9.8	9.6	9.7	9.5	10.1	10.3	11.2	12.0	11.8	11.5	11.8	11.8	11.6	11.0	10.5	9.9	10.2	10.1	10.4	10.8	10.5	10.5
Walla Walla, Wash....	7.1	6.8	6.4	6.5	6.0	6.1	5.9	6.0	5.9	6.1	6.8	6.6	6.6	7.5	8.2	8.5	8.3	7.5	6.5	6.5	6.4	6.8	6.7	6.4	6.7
Washington, D. C.....	5.7	6.2	5.8	5.4	5.6	5.6	5.9	5.3	5.6	7.0	7.9	8.3	8.9	9.0	9.0	8.0	7.0	5.8	5.3	5.9	5.6	5.3	4.8	5.4	6.4
Wichita, Kans.....	8.3	8.5	8.4	9.5	9.9	9.7	8.9	8.7	9.2	9.1	9.8	11.0	11.6	11.3	11.1	10.9	10.5	9.9	8.7	8.7	8.7	8.6	8.4	8.4	9.5
Williston, N. Dak....	7.4	8.0	8.2	8.7	7.5	7.1	7.0	6.9	6.9	7.3	6.7	8.3	9.6	10.2	10.9	9.9	10.5	9.5	8.7	8.5	7.4	6.7	7.0	8.2	8.2
Wilmington, N. C.....	7.5	8.0	8.7	7.8	7.5	7.4	8.2	7.7	8.7	9.7	10.5	11.0	12.1	11.2	10.9	10.5	9.5	8.6	9.0	8.0	8.0	7.8	7.7	7.5	8.9
Winnemucca, Nev.....	10.8	10.9	11.1	11.5	11.8	11.2	11.6	10.8	10.2	10.2	9.5	9.8	10.5	12.0	12.7	14.8	14.5								

TABLE VIII.—Prevailing and resultant winds from self-registers for January, 1894.

Number.	Station.	Prevailing wind.		Total movement.		Resultant direction.			Resultant movement.		Azimuth of movement minus direction.	Ratio of resultant movement to total movement.
		Direction from.	Duration.	Monthly.	Hourly average.	Direction from.	Duration.	Average hourly velocity.	Direction from.	Amount.		
	(1)	(2)	(3) Hours.	(4) Miles.	(5) Miles.	(6)	(7) Hours.	(8) Miles.	(9)	(10) Miles.	(11) °	(12)
1	Eastport, Me.....	NW.	214	10,828	14.6	N. 33 W.	337	13.3	N. 21 W.	4,489	+12	0.415
2	Portland, Me.....	N.	222	5,883	7.9	N. 44 W.	390	8.3	N. 35 W.	3,255	+8	0.553
4	Boston, Mass.....	W.	218	9,126	12.3	N. 23 W.	342	13.1	N. 65 W.	4,490	-42	0.493
5	Nantucket, Mass.....	N.	200	10,051	13.5	N. 23 W.	268	16.0	N. 6 E.	3,330	+29	0.331
8	New Haven, Conn.....	NE.	207	6,671	9.0	N. 17 W.	297	10.6	N. 4 W.	3,166	+13	0.475
10	Albany, N. Y.....	S.	199	6,150	8.3	N. 53 W.	149	8.4	N. 73 W.	1,249	-19	0.204
11	New York, N. Y.....	NW.	182	8,004	10.8	N. 57 W.	154	20.0	N. 35 W.	3,085	+9	0.385
13	Philadelphia, Pa.....	NW.	157	7,651	10.3	N. 52 W.	153	18.8	N. 29 W.	2,877	+23	0.376
15	Baltimore, Md.....	NW.	136	5,413	7.3	N. 29 W.	40	42.0	N. 45 W.	1,681	-17	0.310
16	Washington, D. C.....	S.	179	4,788	6.4	N. 78 W.	72	25.2	N. 40 W.	1,810	+38	0.379
17	Lynchburg, Va.....	SW.	172	3,136	4.2	S. 67 W.	117	8.2	N. 72 W.	957	+41	0.305
18	Norfolk, Va.....	NE.	188	5,839	7.8	N. 18 E.	127	8.7	N. 35 W.	1,110	-34	0.190
24	Wilmington, N. C.....	NE.	197	6,622	8.9	N. 30 W.	199	9.8	N. 28 W.	1,954	+2	0.295
26	Augusta, Ga.....	NE.	149	4,562	6.1	N. 6 W.	142	5.0	N. 18 W.	703	-12	0.154
27	Savannah, Ga.....	NE.	163	6,173	8.3	N. 41 W.	185	8.0	N. 30 W.	1,475	+11	0.239
28	Jacksonville, Fla.....	N.	200	4,651	6.3	N. 30 E.	109	9.4	N. 12 E.	1,020	-18	0.219
30	Key West, Fla.....	E.	320	7,707	10.4	N. 74 E.	568	10.1	N. 35 W.	5,730	-7	0.744
33	Atlanta, Ga.....	E.	216	7,614	10.2	N. 1 E.	130	8.7	N. 10 E.	1,134	+9	0.149
35	Vicksburg, Miss.....	SE.	240	5,506	7.4	S. 67 E.	212	8.1	S. 49 E.	1,723	+18	0.313
39	New Orleans, La.....	NE.	129	6,726	9.0	N. 87 E.	183	5.9	N. 88 E.	1,275	+1	0.189
44	Galveston, Tex.....	S.	168	8,030	10.8	S. 50 E.	186	7.0	S. 60 E.	1,526	-10	0.190
48	Knoxville, Tenn.....	SW.	198	3,394	4.4	N. 74 W.	109	9.6	S. 67 W.	1,048	-39	0.317
49	Memphis, Tenn.....	SE.	163	5,762	7.7	S. 29 E.	134	8.4	S. 26 E.	1,132	+3	0.196
50	Nashville, Tenn.....	SE.	189	4,434	6.0	S. 48 E.	166	6.9	S. 23 E.	1,139	+25	0.257
52	Louisville, Ky.....	S.	183	6,535	8.7	S. 8 W.	216	11.2	S. 19 W.	2,410	+11	0.359
53	Indianapolis, Ind.....	S.	153	5,538	8.8	S. 10 W.	170	9.9	S. 18 W.	1,685	+8	0.305
54	Cincinnati, Ohio.....	SE.	165	5,701	7.7	S. 1 W.	178	9.4	S. 39 W.	1,669	+38	0.293
55	Columbus, Ohio.....	S.	145	7,705	10.4	S. 21 W.	186	14.1	S. 43 W.	2,620	+22	0.341
56	Pittsburg, Pa.....	SW.	175	5,477	7.4	S. 42 W.	216	8.7	S. 57 W.	1,884	+15	0.344
58	Buffalo, N. Y.....	W.	175	10,125	14.8	N. 85 W.	230	24.0	S. 86 W.	5,519	-9	0.543
60	Rochester, N. Y.....	SW.	274	7,041	9.5	S. 34 W.	257	12.0	S. 50 W.	3,085	+16	0.438
62	Cleveland, Ohio.....	SE.	275	10,862	14.0	S. 2 E.	280	17.5	S. 1 W.	4,908	+3	0.450
64	Toledo, Ohio.....	W.	175	7,816	10.5	S. 67 W.	275	13.8	S. 56 W.	3,789	-11	0.485
65	Detroit, Mich.....	SW.	208	8,879	11.9	S. 68 W.	211	20.6	S. 63 W.	4,356	-5	0.490
66	Alpena, Mich.....	W.	241	7,770	10.4	S. 77 W.	226	9.0	S. 59 W.	2,038	-18	0.262
67	Grand Haven, Mich.....	SW.	184	9,260	12.4	S. 68 W.	71	37.9	S. 62 W.	2,693	-6	0.291
68	Marquette, Mich.....	W.	175	7,625	10.2	N. 88 W.	232	11.9	S. 81 W.	2,772	-11	0.364
70	Sault Ste. Marie, Mich.....	SE.	270	6,851	9.2	S. 61 E.	232	4.7	S. 62 E.	1,095	-1	0.160
71	Chicago, Ill.....	SW.	215	14,149	19.0	S. 52 W.	281	21.8	S. 47 W.	6,139	-5	0.434
72	Milwaukee, Wis.....	W.	178	8,224	11.1	S. 80 W.	288	12.5	S. 72 W.	3,594	-8	0.437
74	Duluth, Minn.....	NW.	160	4,503	6.1	N. 31 W.	178	9.4	N. 17 W.	1,681	+14	0.378
75	Moorhead, Minn.....	N.	200	7,879	10.6	N. 83 W.	139	9.3	S. 57 W.	1,302	-40	0.168
77	Bismarck, N. Dak.....	NW.	276	6,269	8.4	N. 32 W.	224	4.7	N. 40 W.	3,286	-8	0.544
79	Saint Paul, Minn.....	SE.	202	5,164	6.9	S. 36 W.	218	7.9	S. 61 W.	1,724	+23	0.334
81	Davenport, Iowa.....	W.	159	7,082	9.5	S. 67 W.	220	13.8	S. 73 W.	3,039	+6	0.428
82	Des Moines, Iowa.....	NW.	166	5,986	8.0	N. 68 W.	181	10.2	N. 72 W.	1,838	-4	0.307
88	Saint Louis, Mo.....	SW.	164	8,788	11.8	S. 16 W.	129	15.4	S. 35 W.	1,989	+19	0.226
90	Kansas City, Mo.....	S.	169	7,043	9.4	S. 18 W.	99	8.1	S. 55 W.	803	+37	0.114
92	Omaha, Nebr.....	NW.	242	5,587	7.5	N. 79 W.	152	8.9	N. 59 W.	1,355	+20	0.243
96	Huron, S. Dak.....	NE.	234	8,308	11.2	N. 42 W.	110	11.0	N. 33 W.	1,212	+9	0.146
98	Havre, Mont.....	SW.	225	8,034	10.8	N. 81 W.	310	1.5	S. 73 W.	480	-25	0.060
100	Helena, Mont.....	SW.	289	4,840	6.5	S. 69 W.	421	8.6	S. 57 W.	3,637	-12	0.752
105	Colorado Springs, Colo.....	N.	284	8,354	11.2	N. 23 W.	226	15.3	N. 26 W.	3,495	-3	0.415
107	Denver, Colo.....	S.	209	6,632	8.9	S. 49 W.	168	9.8	S. 83 W.	1,645	+34	0.248
108	Pikes Peak, Colo.....	W.	213	24,252	32.6	N. 71 W.	420	38.4	N. 70 W.	16,107	+1	0.638
111	Dodge City, Kans.....	SE.	152	7,087	9.5	N. 58 E.	65	12.9	N. 36 E.	836	-22	0.119
114	Abilene, Tex.....	SW.	194	7,319	9.8	S. 43 W.	239	10.9	S. 47 W.	2,598	+4	0.355
116	El Paso, Tex.....	NW.	410	7,153	9.6	N. 57 W.	371	12.8	N. 50 W.	4,702	+7	0.666
117	Santa Fe, N. Mex.....	NE.	233	5,208	7.0	N. 26 E.	177	10.6	N. 60 E.	1,889	+34	0.363
119	Yuma, Ariz.....	N.	261	5,614	7.5	N. 2 W.	379	9.0	N. 15 W.	3,401	-13	0.606
120	Keeler, Cal.....	E.	171	4,084	5.5	S. 69 E.	134	4.8	S. 11 E.	648	+58	0.159
122	Salt Lake City, Utah.....	SE.	234	4,135	5.6	S. 8 E.	263	6.5	S. 1 E.	1,699	+7	0.411
125	Spokane, Wash.....	S.	221	4,321	5.8	S. 11 W.	132	16.1	S. 8 W.	2,125	-3	0.492
128	Olympia, Wash.....	S.	376	4,236	5.7	S. ...	335	8.3	S. 2 W.	2,780	+2	0.656
132	Portland, Oregon.....	SW.	200	8,092	10.9	S. 51 W.	249	19.2	S. 40 W.	4,778	-11	0.591
133	Roseburg, Oregon.....	SW.	145	2,672	3.6	S. 5 E.	241	5.1	S. 1 E.	1,227	+4	0.459
137	San Francisco, Cal.....	NW.	224	5,945	8.0	S. 69 W.	223	9.3	S. 36 W.	2,077	-33	0.349
140	San Diego, Cal.....	NW.	180	3,746	5.0	N. 34 W.	352	6.0	N. 50 W.	2,117	-16	0.565

TABLE IX.—Resultant winds from observations at 8 a. m. and 8 p. m., daily, during January, 1894.

Number.	Station.	Component direction from—				Resultant.		Number.	Station.	Component direction from—				Resultant.	
		N.	S.	E.	W.	Direction from—	Duration.			N.	S.	E.	W.	Direction from—	Duration.
New England.															
1	Eastport, Me.	33	9	9	26	n. 35 w.	29	73	Green Bay, Wis.	21	26	7	22	s. 72 w.	16
2	Portland, Me.	33	8	6	27	n. 40 w.	33	74	Duluth, Minn.	27	6	16	28	n. 30 w.	24
3	Northfield, Vt.	31	26	4	7	n. 31 w.	0		Extreme Northwest.						
4	Boston, Mass.	22	10	6	38	n. 69 w.	34	75	Moorhead, Minn.	24	23	6	14	n. 83 w.	8
5	Nantucket, Mass.	29	15	12	19	n. 26 w.	16	76	Saint Vincent, Minn.	25	19	8	15	n. 49 w.	9
6	Woods Holl, Mass.							77	Bismarck, N. Dak.	27	12	15	24	n. 31 w.	17
7	Block Island, R. I.	26	10	18	28	n. 32 w.	19	78	Williston, N. Dak.	15	21	13	24	s. 62 w.	13
8	New Haven, Conn.	34	8	15	19	n. 9 w.	20		Upper Mississippi Valley.						
9	New London, Conn.	24	10	9	30	n. 56 w.	25	79	Saint Paul, Minn.	11	25	18	27	s. 33 w.	17
Middle Atlantic states.								80	La Crosse, Wis.	21	24	4	23	s. 81 w.	19
10	Albany, N. Y.	29	20	8	16	n. 42 w.	12	81	L'avenport, Iowa	15	21	11	20	s. 68 w.	16
11	New York, N. Y.	23	19	16	23	n. 61 w.	8	82	Des Moines, Iowa	22	18	10	25	n. 76 w.	16
12	Harrisburg, Pa.	15	14	25	21	n. 76 e.	4	83	Imbuque, Iowa	14	26	9	25	s. 53 w.	20
13	Philadelphia, Pa.	23	14	15	23	n. 42 w.	12	84	Keokuk, Iowa	21	21	12	19	... w.	7
14	Atlantic City, N. J.	22	14	16	23	n. 41 w.	10	85	Cairo, Iowa	17	30	13	14	s. 4 w.	13
15	Baltimore, Md.	20	14	20	19	n. 10 e.	6	86	Springfield, Ill.	17	31	11	16	s. 19 w.	15
16	Washington, D. C.	23	22	11	19	n. 83 w.	8	87	Hannibal, Mo.	20	20	13	20	... w.	7
17	Lynchburg, Va.	13	20	17	20	s. 52 w.	11	88	Saint Louis, Mo.	18	27	13	17	s. 23 w.	10
18	Norfolk, Va.	24	14	19	19	n. ...	10		Missouri Valley.						
South Atlantic states.								89	Columbia, Mo.						
19	Charlotte, Va.	11	24	21	20	s. 4 e.	13	90	Kansas City, Mo.	21	26	13	11	s. 22 e.	5
20	Hatteras, N. C.	34	14	8	19	n. 29 w.	23	91	Springfield, Mo.	17	28	22	10	s. 47 e.	16
21	Kittyhawk, N. C.	25	13	22	17	n. 22 e.	13	92	Omaha, Nebr.	24	25	7	19	s. 85 w.	12
22	Raleigh, N. C.	29	18	9	18	n. 39 w.	14	93	Valentine, Nebr.	24	10	5	37	n. 67 w.	34
23	Southport, N. C.	30	7	17	23	n. 14 w.	24	94	Sioux City, Iowa	29	17	11	17	n. 26 w.	14
24	Wilmington, N. C.	25	15	10	20	n. 21 w.	11	95	Pierre, S. Dak.	18	18	23	18	... e.	5
25	Charleston, S. C.	25	17	13	17	n. 26 w.	9	96	Huron, S. Dak.	28	16	14	23	n. 37 w.	15
26	Augusta, Ga.	24	10	18	20	n. 8 w.	14	97	Yankton, S. Dak.	28	13	13	33	n. 53 w.	25
27	Savannah, Ga.	25	15	13	25	n. 50 w.	16		Northern slope.						
28	Jacksonville, Fla.	30	18	13	9	n. 18 e.	13	98	Havre, Mont.	19	12	10	37	n. 75 w.	28
Florida peninsula.								99	Miles City, Mont.	18	23	10	21	s. 55 w.	14
29	Jupiter, Fla.	14	19	21	19	s. 22 e.	5	100	Helena, Mont.	9	22	2	41	s. 72 w.	41
30	Key West, Fla.	22	5	45	2	n. 68 e.	40	101	Rapid City, S. Dak.	23	11	14	25	n. 43 w.	16
31	Tampa, Fla.	25	11	22	14	s. 30 e.	16	102	Cheyenne, Wyo.	23	10	1	42	n. 74 w.	43
32	Titusville, Fla.	22	20	21	20	n. 25 e.	2	103	Lander, Wyo.	14	22	19	23	s. 26 w.	9
Eastern Gulf states.								104	Kearney, Nebr.	25	16	10	25	n. 63 w.	20
33	Atlanta, Ga.	25	8	23	27	n. 13 w.	18	105	North Platte, Nebr.	18	8	11	35	n. 67 w.	26
34	Pensacola, Fla.	20	20	19	12	n. 49 e.	9		Middle slope.						
35	Mobile, Ala.	28	23	7	15	n. 55 w.	9	106	Colorado Springs, Colo.	40	11	9	11	n. 4 w.	29
36	Montgomery, Ala.	21	17	25	10	n. 76 e.	16	107	Denver, Colo.	17	22	12	23	s. 66 w.	13
37	Meridian, Miss.	24	17	20	10	n. 67 e.	17	108	Pikes Peak, Colo.	27	9	5	30	n. 60 w.	36
38	Vicksburg, Miss.	18	24	29	9	s. 74 e.	21	109	Pueblo, Colo.	21	8	14	28	n. 47 w.	19
39	New Orleans, La.	20	10	28	8	n. 78 e.	20	110	Concordia, Kans.	22	24	10	19	s. 77 w.	9
Western Gulf states.								111	Dodge City, Kans.	20	21	22	10	s. 76 e.	4
40	Shreveport, La.	30	7	17	23	n. 14 w.	24	112	Wichita, Kans.	25	29	8	7	s. 14 e.	4
41	Fort Smith, Ark.	10	11	34	15	s. 87 e.	19	113	Oklahoma, Okla.	25	25	5	11	s. 64 w.	7
42	Little Rock, Ark.	16	25	18	14	s. 21 e.	11		Southern slope.						
43	Corpus Christi, Tex.	23	22	24	9	n. 87 e.	15	114	Abilene, Tex.	17	31	10	17	s. 27 w.	16
44	Galveston, Tex.	17	28	22	9	s. 49 e.	17	115	Amarillo, Tex.	14	29	5	20	s. 45 w.	21
45	Palestine, Tex.	18	23	19	12	... e.	5		Southern plateau.						
46	San Antonio, Tex.	17	17	28	12	... e.	10	116	El Paso, Tex.	26	6	13	34	n. 43 w.	31
Ohio Valley and Tennessee.								117	Santa Fe, N. Mex.	28	20	24	15	n. 48 e.	12
47	Chattanooga, Tenn.	16	26	20	15	s. 26 e.	11	118	Tucson, Ariz.	10	27	12	20	s. 35 w.	14
48	Knoxville, Tenn.	21	12	18	18	n. ...	12	119	Yuma, Ariz.	42	4	13	11	n. 3 e.	38
49	Memphis, Tenn.	14	25	23	10	s. 49 e.	17	120	Keeler, Cal.	15	18	20	14	s. 34 e.	4
50	Nashville, Tenn.	16	25	24	9	s. 59 e.	17		Middle plateau.						
51	Lexington, Ky.	15	30	14	27	s. 41 w.	20	121	Winnemucca, Nev.	12	26	14	29	s. 47 w.	20
52	Louisville, Ky.	13	32	15	13	s. 6 e.	19	122	Salt Lake City, Utah	11	31	22	13	s. 66 e.	22
53	Indianapolis, Ind.	15	25	18	18	s. ...	10		Northern plateau.						
54	Cincinnati, Ohio	13	25	21	17	s. 18 e.	13	123	Baker City, Oreg.	12	30	23	19	s. 12 e.	18
55	Columbus, Ohio	10	29	15	17	s. 8 w.	13	124	Idaho Falls, Idaho	16	35	6	19	s. 35 w.	23
56	Pittsburg, Pa.	12	25	15	24	s. 35 w.	16	125	Spokane, Wash.	17	30	13	11	s. 8 e.	13
57	Parkersburg, W. Va.	10	27	30	14	s. 19 e.	18	126	Walla Walla, Wash.	9	44	8	11	s. 6 w.	35
Lower Lake region.								127	North Pacific coast region.						
58	Buffalo, N. Y.	19	16	13	30	n. 80 w.	17	127	Fort Canby, Wash.	11	23	16	18	s. 9 w.	12
59	Oswego, N. Y.	12	26	19	21	s. 8 w.	14	128	Olympia, Wash.	14	39	8	8	s. ...	25
60	Rochester, N. Y.	9	34	16	23	s. 16 w.	20	129	Port Angeles, Wash.	3	44	13	11	s. 3 e.	41
61	Erie, Pa.	8	29	10	28	s. 41 w.	28	130	Seattle, Wash.	18	33	15	3	s. 41 e.	20
62	Cleveland, Ohio	8	30	25	17	s. 20 e.	23	131	Tatoosh, Island, Wash.	5	20	33	13	s. 53 e.	25
63	Sandusky, Ohio	10	25	10	34	s. 58 w.	29	132	Portland, Oreg.	19	32	6	17	s. 41 w.	17
64	Toledo, Ohio	11	20	10	33	s. 68 w.	25	133	Roseburg, Oreg.	12	30	18	18	s. ...	18
65	Detroit, Mich.	13	21	16	30	s. 60 w.	16		Middle Pacific coast region.						
Upper Lake region.								134	Eureka, Cal.	18	31	13	17	s. 17 w.	14
66	Alpena, Mich.	15	20	12	30	s. 75 w.	19	135	Red Bluff, Cal.	25	19	13	24	n. 62 w.	15
67	Grand Haven, Mich.	15	17	21	23	s. 45 w.	3	136	Sacramento, Cal.	18	29	17	16	s. 5 e.	11
68	Marquette, Mich.	19	18	9	27	n. 87 w.	18	137	San Francisco, Cal.	10	23	13	32	s. 55 w.	23
69	Port Huron, Mich.	10	27	12	27	s. 42 w.	23		South Pacific coast region.						
70	Sault Ste. Marie, Mich.	14	25	29	11	s. 58 e.	21	138	Fresno, Cal.	21	13	24	21	n. 21 e.	8
71	Chicago, Ill.	15	30	10	25	s. 14 w.	16	139	Los Angeles, Cal.	26	5	16	28	n. 30 w.	24
72	Milwaukee, Wis.	15	18	9	34	s. 83 w.	25	140	San Diego, Cal.	30	4	13	28	n. 30 w.	30

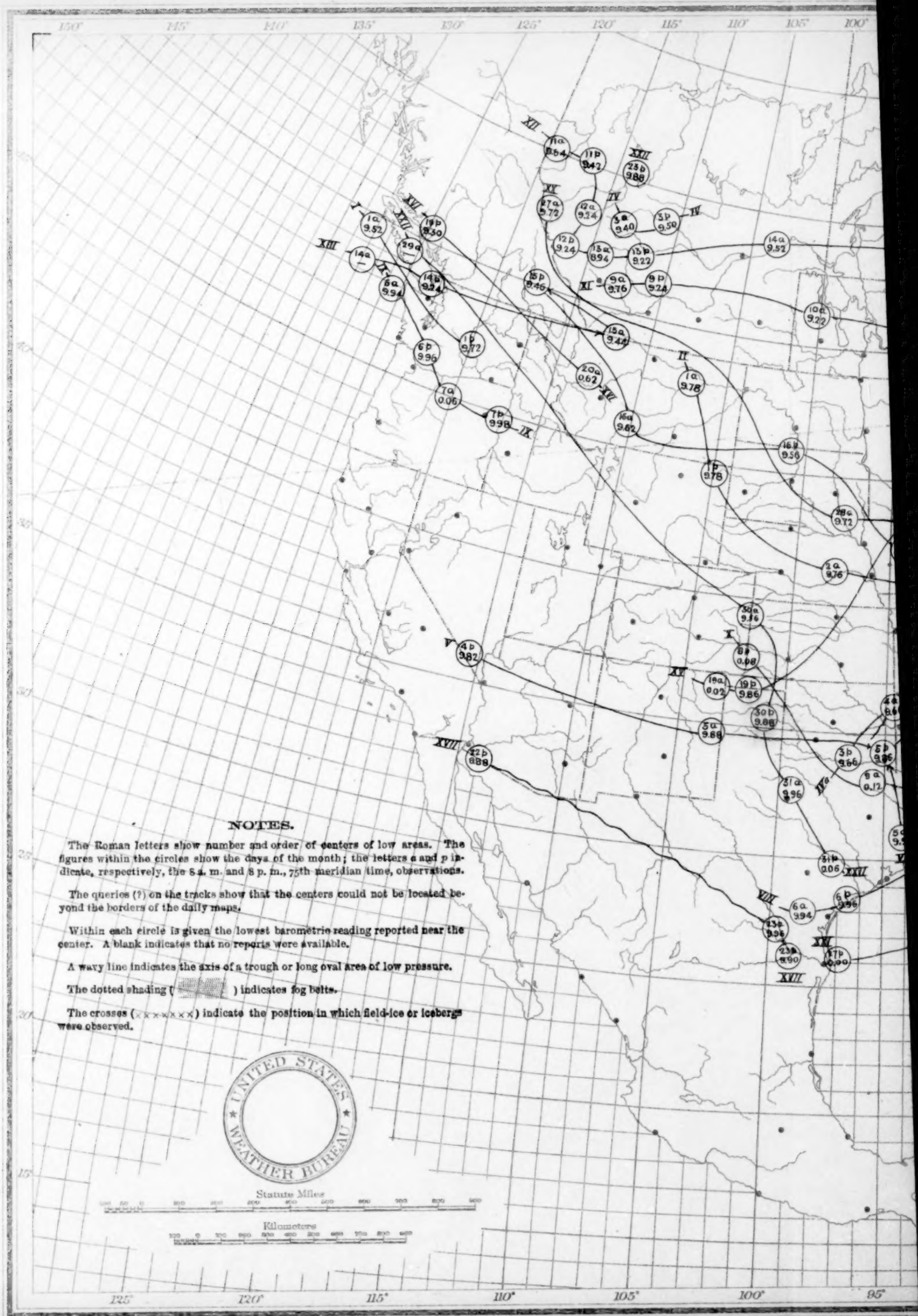
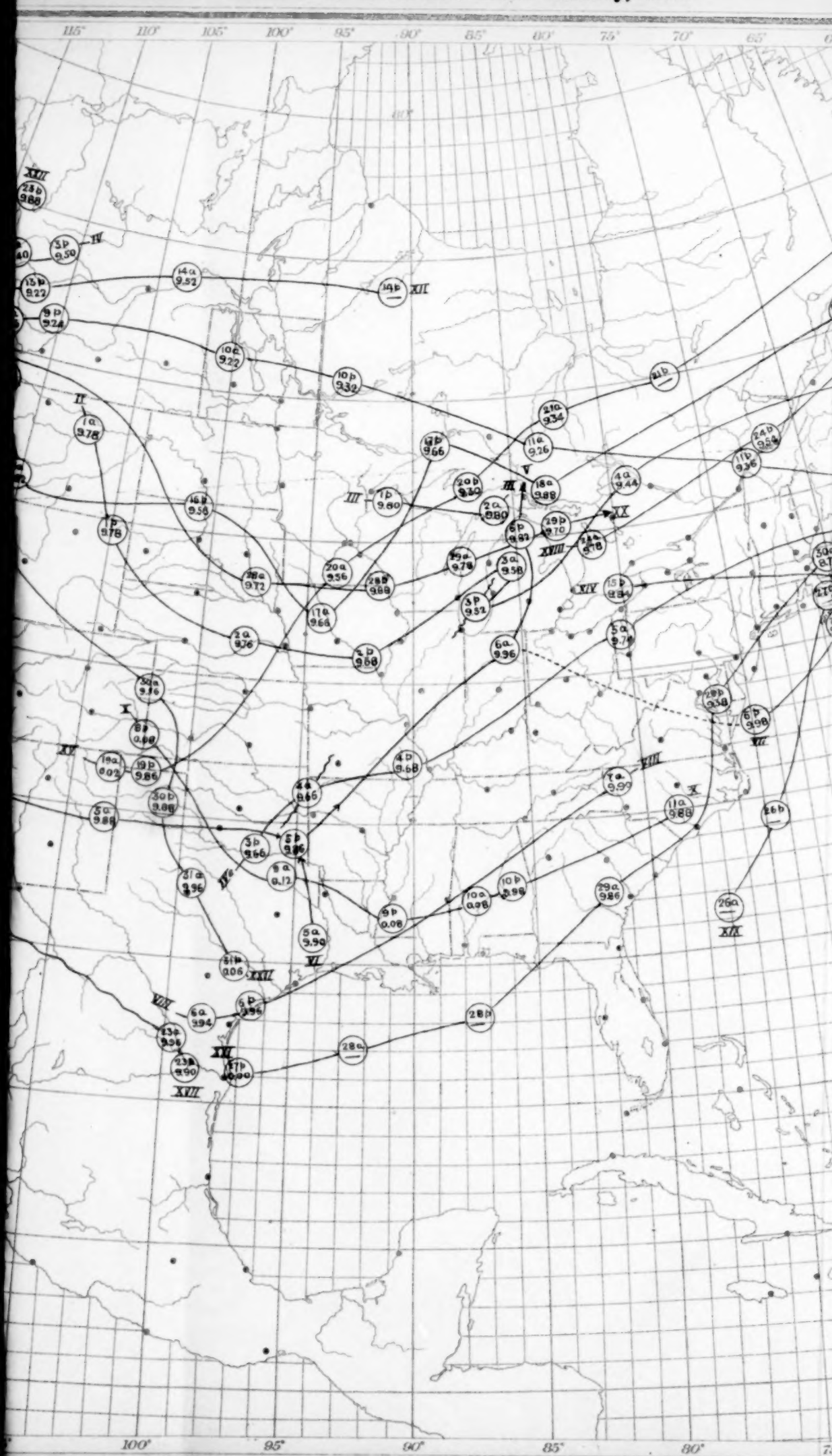


Chart I. Tracks of Centers of Low Areas. January, 1894.



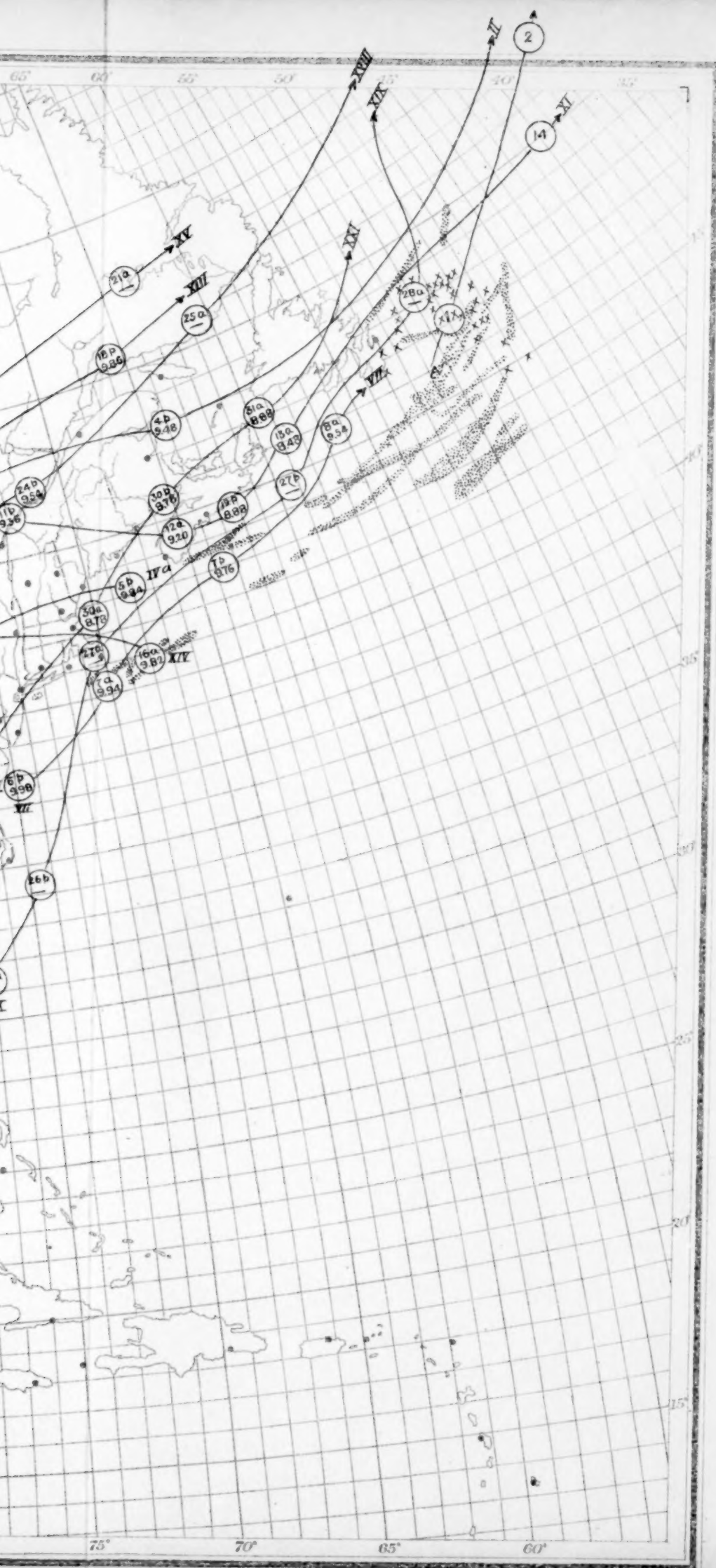


Chart II. Isobars, Isotherms, and Resultant Winds. January, 1894.

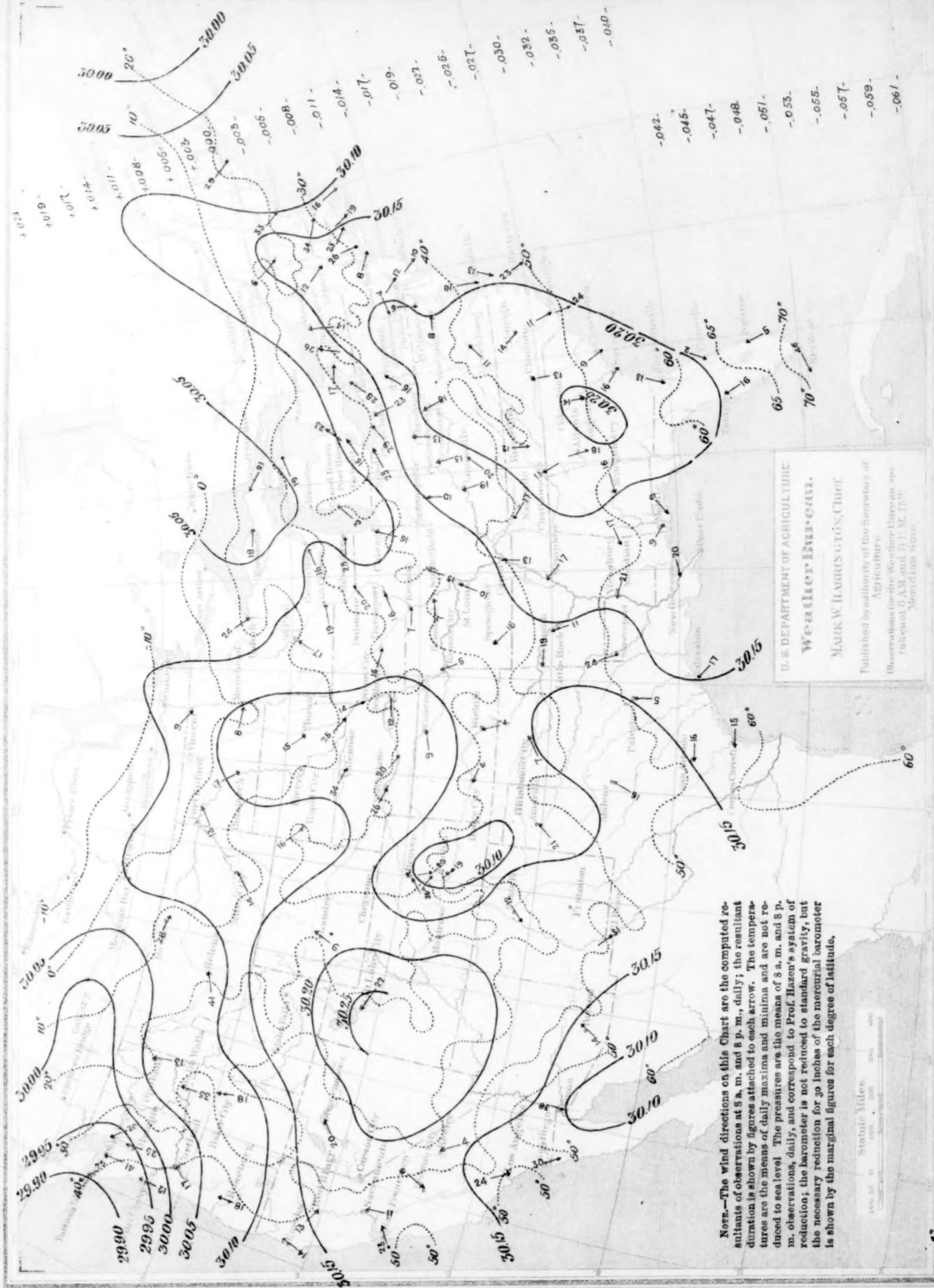


Chart III. Total Precipitation. January, 1894.

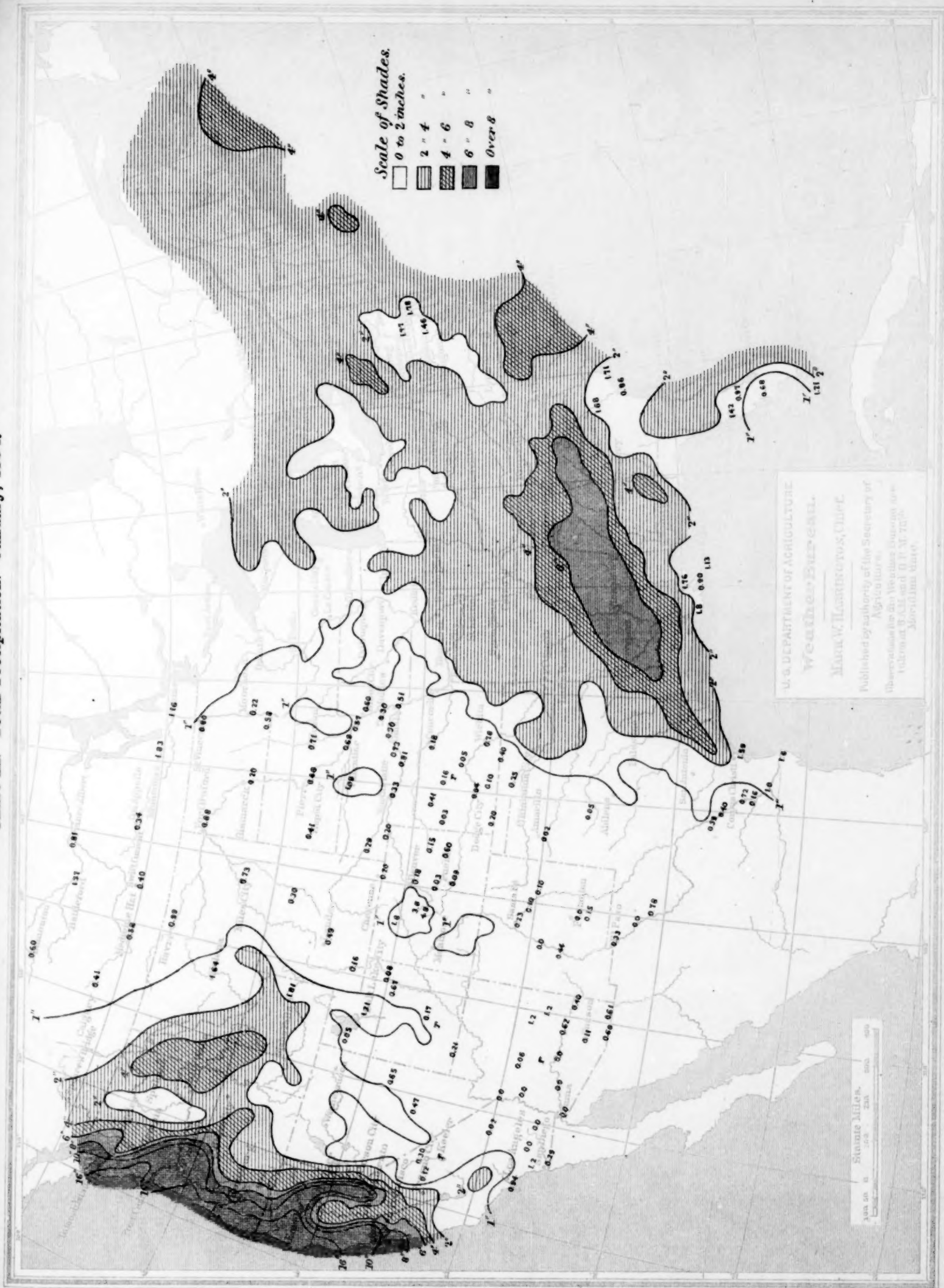
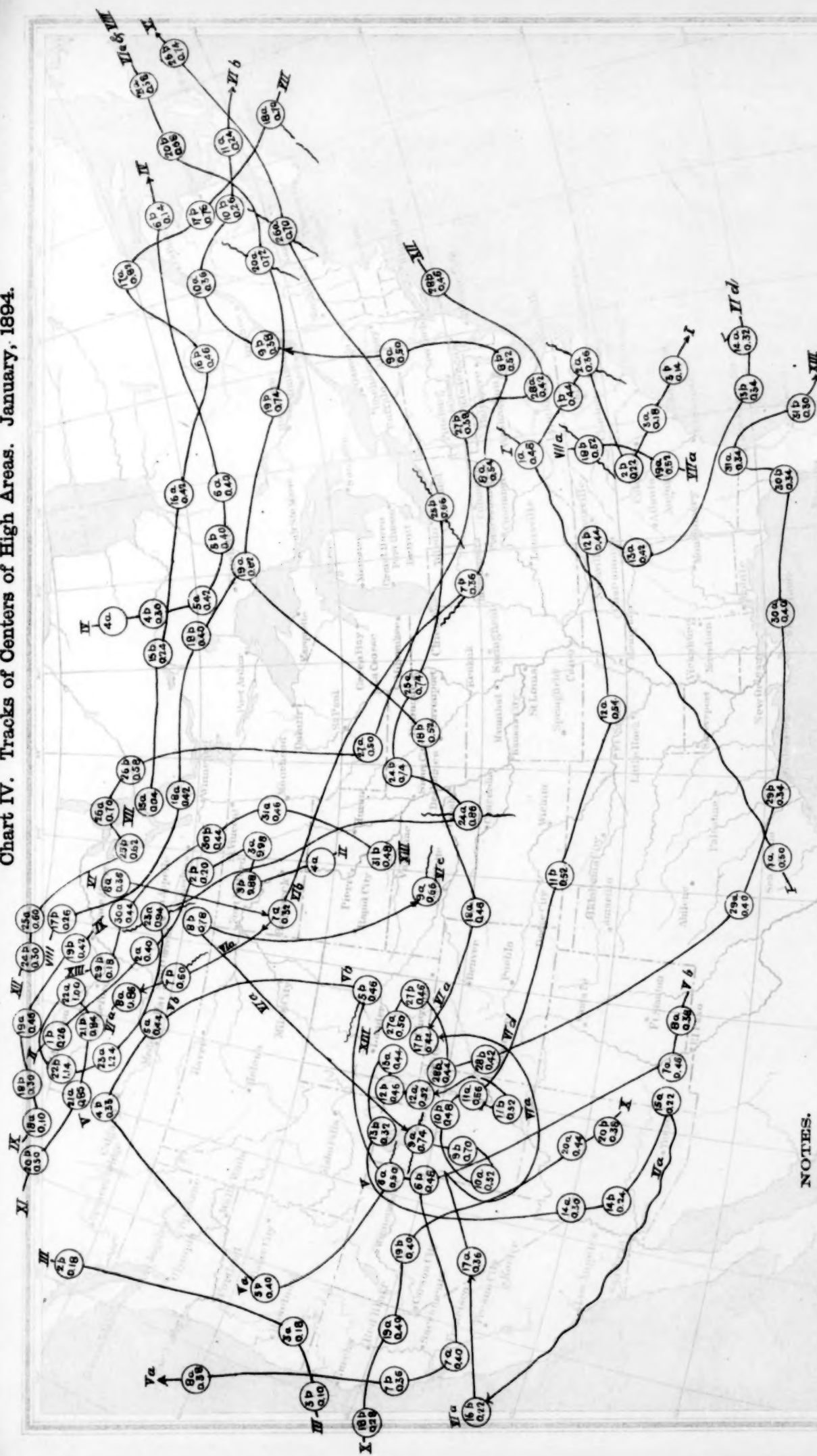


Chart IV. Tracks of Centers of High Areas. January, 1894.



NOTES.

The Roman letters show number and order of centers of high areas. The figures within the circles show the days of the month; the letters a and p indicate, respectively, the 8 a. m. and 8 p. m., 75th meridian time, observations.

Within each circle is given the highest barometric reading reported near the center.

A short wavy line indicates the axis of a ridge of high pressure.

U. S. DEPARTMENT OF AGRICULTURE.

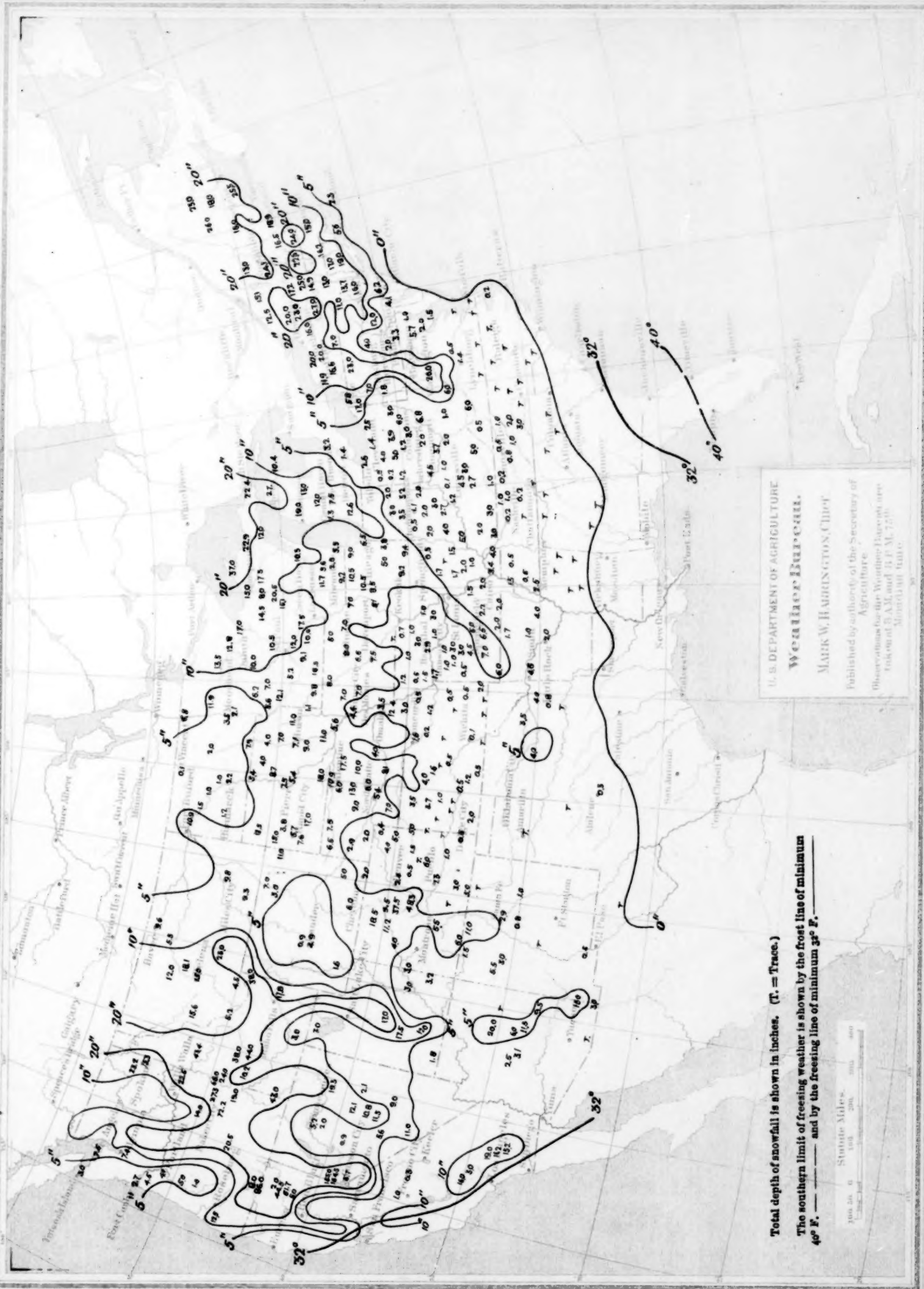
WEATHER BUREAU.

MAJOR W. HARRINGTON, CHIEF.

Published by authority of the Secretary of Agriculture.

Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M. 75th Meridian time.

Chart V. Depth of Snowfall (inches) and Limits of Freezing Weather, January, 1894.



Total depth of snowfall is shown in inches. (T. = Trace.)

The southern limit of freezing weather is shown by the frost line of minimum 40° F. ——— and by the freezing line of minimum 32° F. - - - - -

Statute Miles.
0 100 200 300 400

U.S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
MARK W. HARRINGTON, CHIEF
Published by authority of the Secretary of Agriculture
Observations for the Weather Bureau were taken at 5 A.M. and 5 P.M. 1894.

Chart VI. Depth of Snow lying on ground January 31, 1894.

